BROOKLYN BOTANIC GARDEN

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EDITED BY
C. STUART GAGER

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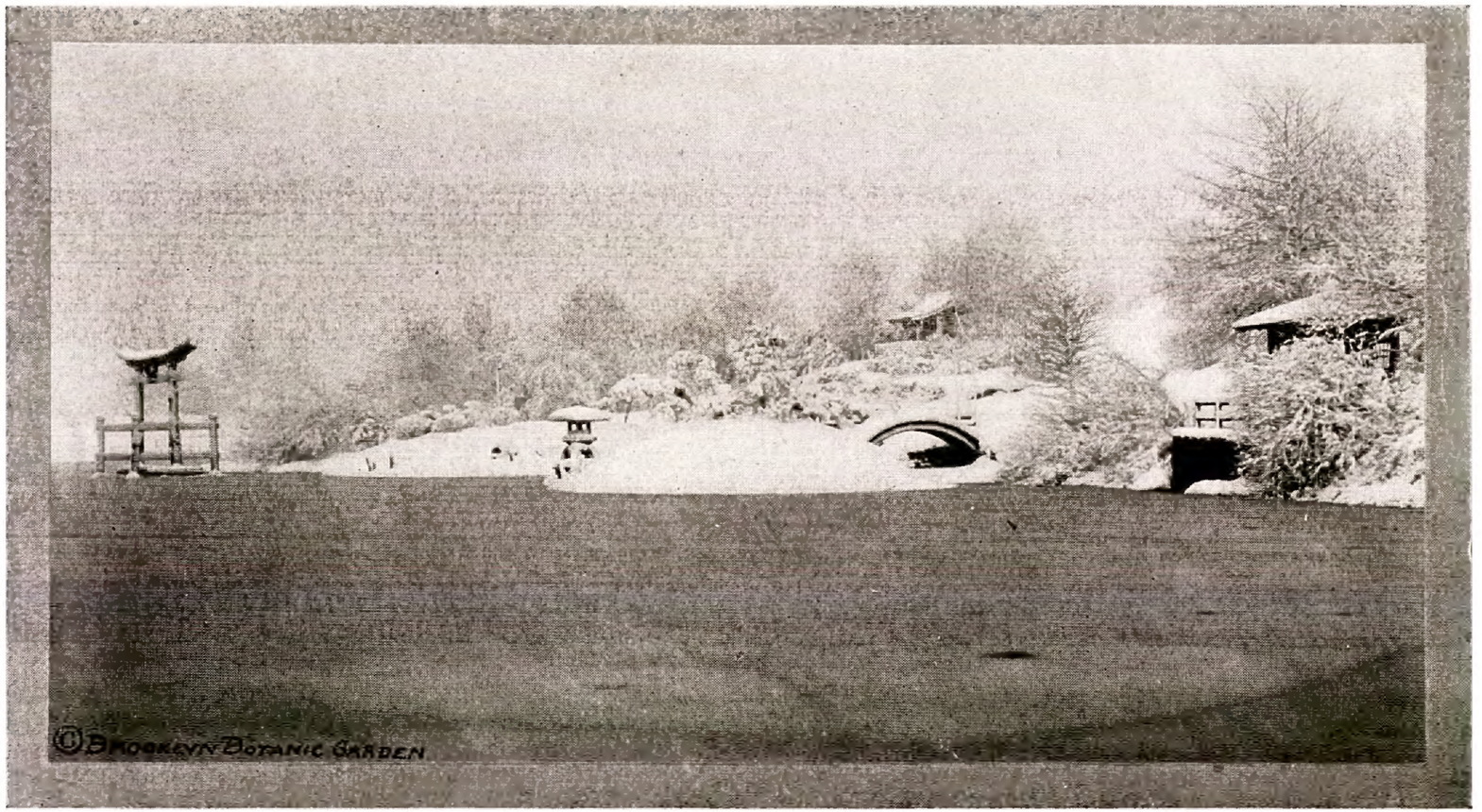

Fig. 1. The Japanese Garden during a snow storm.

THE BROOKLYN INSTITUTE OF ARTS AND SCIENCES

BROOKLYN BOTANIC GARDEN RECORD

VOL. V January, 1916 No. 1

PROSPECTUS OF COURSES OFFERED BY THE BROOKLYN BOTANIC GARDEN, 1916

A. CHILDREN'S GARDENS AND NATURE STUDY

Courses for Children

A1. Garden Practice.—A course in outdoor work, open only to those pupils who are recommended by their teachers for excellence in nature study in their schools. The work includes the raising of common vegetables, flowers, and fiber plants. Open to both boys and girls. A *fee of twenty cents* will be charged, the material raised becoming the property of the pupil. Twelve lessons every *Saturday* morning, 10:30–11:30, from *April 8–June 24.*

Miss Shaw.

A2. Summer Garden Work.—A summer's work in the garden, each child having his own plot. This is a continuation of Course A1. A *fee of twenty cents* a month will be charged for material consumed except to those continuing from Course A1, who will be charged *ten cents.* Each child has the product from his own garden. *Saturday* mornings, 9–11, *July 8–September 23.*

Miss Shaw.

A3. Nature Study.—The structure and germination of seeds; the parts of a plant and their uses; relation of the plant to soil, air, water, and light. The course consists of study of the plants themselves, with experiments and greenhouse work done by the

children; no book work, no home work, no examinations. Open to children from 8–12 years of age. A *fee of ten cents* will be charged to cover material used. A certificate will be given those who satisfactorily complete the course. Two courses will be given each spring and two each fall, as follows:

Boys' Spring Course.—*Saturday* mornings, 9–10, from *January 22–March 11.*

Girls' Spring Course.—*Saturday* mornings, 10:30–11:30, from *January 22–March 11.*

Boys' Fall Course.—*Saturday* mornings, 9–10, from *October 14–November 18.*

Girls' Fall Course.—*Saturday* mornings, 10:30–11:30, from *October 14–November 18.* Miss Shaw.

A4. Plant Propagation.—Raising of plants from seeds for the outdoor vegetable and flower garden; elementary study of soils. Work done in the children's greenhouse. *Fee,* for material used, *fifteen cents.* Girls and boys from 12 to 15 years of age are eligible to these courses. Two of these courses will be offered each spring and two each fall, as follows:

Girls' Spring Course.—*Friday* afternoons, 3:30–4:30, *January 21–March 10.*

Boys' Spring Course.—*Saturdays,* 1:00–2:00, *January 22–March 11.*

Girls' Fall Course.—*Friday* afternoons, 3:30–4:30, *October 13–November 17.*

Boys' Fall Course.—*Saturdays,* 1:00–2:00, *October 14–November 18.* Miss Shaw.

A5. Advanced Nature Study.—A course designed for those older boys and girls who have taken courses A1–A4. Plant collections will be made, and the simpler principles of classification studied. Special problems will be assigned to individuals, and larger garden plots will be set aside for the further working out of these problems. *Open only to pupil assistants of the Garden.* For details confer with Miss Shaw.

Girls' Spring Course.—*Thursdays,* 4–6, *March 2–June 22.*

Boys' Spring Course.—*Thursdays,* 3:30–5, *March 2–June 22.*

Girls' Fall Course.—*Thursdays,* 4–5, *October 5–November 23.*

BOYS' FALL COURSE.—*Thursdays, 4–5, October 5–November 23.*
Miss Shaw, Dr. Gundersen, Mr. Stoll.

A6. Junior Gardener's Course.—A course for boys from 14–17 years of age. Lessons given in the care of border and other flower beds, in the weeding and care of small vegetable gardens, in mowing and watering lawns, repotting plants, etc. This is planned to fit boys for summer work and to enable them to obtain positions. Hours to be arranged. *Fee twenty cents.* Practical work with the gardeners and foreman, under Miss Shaw's supervision.

A7. Nature Study for Boy Scouts, Camp Fire Girls, and Others.—Short courses of at least four hours each, with talks, demonstrations, and field trips in the Botanic Garden and Prospect Park to study trees, shrubs, etc. The instruction will be adapted to meet the needs of the various groups who apply. *Open only to groups of at least six persons,* at hours to be arranged.
Mr. Stoll.

Courses for Teachers

A8. Greenhouse Work for Teachers.—This course is planned to be of assistance to the teacher in garden work with children. A study of soils, and of the plant itself. Practical work in the propagation of plants, and the raising of flower and vegetable seedlings for the outdoor garden. A *fee of fifty cents* will be charged to cover cost of materials. *Thursday* afternoons, from 4–5, *January 20–March 9.* Miss Shaw.

A9. Nature Study for Teachers.—Intended to familiarize teachers with material suitable for class use and with easily accessible sources. The work given will be practical, such as may be applied in the Nature Study teaching of the class room. A *fee of fifty cents* will be charged to cover cost of material. *Thursdays,* from 4–5. *March 16–June 1.* Miss Cross.

Lectures for Children

(Admission only by Ticket)

Stories About Useful Plants. (Illustrated.)
April 29. How to make a garden.

May 6. How to make Brooklyn more beautiful.
May 13. Rubber, a very useful plant.
May 20. Sugar, and how it is obtained.
May 27. The wild flowers now in bloom.

It is necessary to limit the number of tickets for these talks to children. This is due to the small size of the present lecture room. Not more than 70 children can be accommodated at any one talk. Tickets will be issued in the order of application until the number is exhausted.

The talks will be repeated for school classes, if so desired, either at the Garden or at the school.

B I. Courses for Teachers of Children's Gardening

There is an increasing demand for persons adequately prepared to become teachers or supervisors of children's gardens, but opportunities to secure the necessary preparation are not numerous. As in other cases where special problems are to be met and solved, an interest in children, a mere liking for the work, or even native teaching ability, while highly essential, are not, of themselves, sufficient to insure success.

The following ten courses are planned to acquaint the prospective teacher with some of the main problems to be met with in this work, and such effective solutions of them as have been worked out in practice. *The ten courses are considered as a unit, and are not offered separately.* Whenever possible it is urged that the entire course be completed within two school years. Special importance is attached to No. B10.

The *fee for the entire course is Fifteen Dollars.* Even though credit be given for work done elsewhere, the minimum charge for a certificate will in any case be Ten Dollars.

To those who satisfactorily complete the work a Certificate in Children's Gardening will be granted.

B1. Soils and Agricultural Principles.—A study of soils; fertilizers, natural and chemical; relation of water and air to soil; liming; mixing of soils and tillage. Five lectures with laboratory work. *Tuesday* afternoons, from 4–5, *January 18–February 15.*
Miss Shaw.

B2. Elementary Botany.—A survey of general physiological and morphological principles, illustrated by a few of the more important types of plants. Sixteen lectures and demonstrations in laboratory and greenhouse. A high-school course in botany, extending over at least one half year, will be accepted in place of this course. *Fridays* at 4 p. m., *January 21–May 5.*

Dr. Olive and Dr. Gundersen.

B3. Children's Garden Practice.—Practice work with a class of children; including such topics as planning and making the garden, laying out of grounds, preparation of soil, seed sowing, transplanting, cropping, cultivation, the construction of simple garden utensils, school garden management, improvement of school grounds, preparation of exhibits. Twenty lectures and outdoor practice work. *Saturday* mornings, 10–11:30, from *February 5–June 17.* Miss Shaw, Miss Cross and Mr. Stoll.

B4. Plant Propagation and Greenhouse Work.—Methods of plant propagation, care of plants, cuttings, raising of seedlings for the outdoor garden. Work related to children's gardens. Laboratory work. Eight lessons. *Wednesdays,* from 3:30–5 p. m., *February 23–April 12.* Miss Shaw and Miss Cross.

B5. Nature Study.—Nature in relation to gardens and plant life. Topics: plant structure; fruit and fruit formation; weeds; weed dispersal; insect pests; birds in their relation to agriculture; garden friends; shrubs; shade and lawn trees. Credit will be given for this course in Nature Study on presentation of a satisfactory certificate of similar work done at any other accredited institution. Twenty lectures. *Tuesdays,* 4–5 p. m., *February 29–May 16* and *October 3–November 21.* Miss Cross.

B6. Fungous and Insect Pests.—Three lectures and demonstrations on the occurrence of, and methods of combating the common fungous and insect pests of garden and greenhouse plants. *Fridays,* at 4 p. m., *May 12–May 26.* Dr. Olive.

B7. Fall Garden Work.—Practical work with the outdoor bulb bed, harvesting of garden crops, indoor planting of bulbs, raising of plants indoors, the window box. Five lessons on *Wednesday* afternoons, from 4–5, *October 4–November 1.* Miss Shaw.

B8. Pedagogy of Botany.—A brief discussion of the mental processes involved in learning and teaching science, and the fundamental principles which underlie and point the way to laboratory and field work. Three successive *Saturday* afternoons, from 1:30 to 2:30, *November 4–November 18.* Dr. Gager.

B9. Genetics.—Four lectures on the problems of heredity, variation and environment, and their bearing on education; illustrated by demonstration material obtained from plant-breeding experiments, and by lantern slides. Lecture subjects: Kinds and extent of variation in plants and animals; How characters are inherited; Sex in plants and the methods of crossing; Human heredity. *Saturdays,* from 2:30–3:30, *November 4–November 25.* Dr. White.

B10. Practical Garden Work.—A summer's work with children in a garden under supervision. This work may be done at the Brooklyn Botanic Garden, or its equivalent in some children's garden, the work of which is acceptable to the Botanic Garden.

B II. Summer School of Children's Gardening

Courses B1–B10 are also offered as a concentrated six-weeks' summer course, from *July 5* to *August 15, 1916.* For circular and further information apply to Miss Ellen Eddy Shaw.

C. Courses for the General Public

C1. Garden Planning.—Three lectures with practical demonstrations. The object of this course is to help owners of small places to plan their yards and gardens to best advantage. *Wednesdays* at 4, *February 23–March 8.* Mr. Free.

C2. The Outdoor Flower Garden.—Ten lectures with demonstrations and practical work. Instruction will be given with regard to soils, preparation of grounds for planting, propagation, hardy perennials, annuals, vines, herbaceous borders, summer bedding, shrubbery, roses, making and care of lawns, drainage, etc. A *fee of $1.00* will be charged to cover cost of materials used. *Wednesdays* at 4, *March 10–May 17.* Mr. Free.

C3. House Plants and Small Conservatories.—Five lectures with demonstrations and practical work. The course includes consideration of principles to be observed in the care of indoor plants, and cultural details concerning suitable subjects. Instruction will be given with reference to hanging baskets, window boxes, Wardian cases, etc. A *fee of $2.50* will be charged to cover cost of materials used. The plants raised by the class will become the property of those taking the course. *Wednesdays* at 4, *January 19–February 16.*

Mr. Free.

C4. Garden and Greenhouse Work in Fall.—A course of six lessons covering the making of cuttings, taking up and storing of plants, bulb planting, winter protection of plants, fall pruning, etc. *Thursday afternoons* from 4–5, *September 28–November 2.* A *fee of $1.00* will be charged to cover cost of material used.

Mr. Free.

C6. Local Flora.—These two courses are specially planned for teachers of nature-study, and for others who wish to become more familiar with the wild plants about them. Numerous specimens will be brought to the class-room for study. Part of the time will be given to field study, mainly in the Botanic Garden or Prospect Park.

Spring Course.—Evergreens and other trees in the winter condition, followed by wild flowers and ferns. *Saturdays,* at 3 o'clock. *March 11–June 10.*

Fall Course.—A study of fall flowers and weeds, trees and shrubs. *Saturdays,* at 3 o'clock. *October 7–December 9.*

Dr. Gundersen.

C7. History of Botany.—Six lectures giving a brief outline of the history of botany from the time of the Greeks to the present. *Saturdays,* at 3 o'clock, *January 29–March 4.* Dr. Gundersen.

C8. Bacteria and Other Micro-organisms in the Home.—Eight periods devoted to lectures, and demonstrations on the occurrence of bacteria, yeasts, molds and other micro-organisms in the home; in water, sewage, etc. *Saturdays,* at 11:00, *February 5–March 25.*

Dr. Olive.

C9. Heredity and Environment.—Five lectures, planned *especially* for teachers, preachers, and social workers. Special emphasis will be laid upon the part played by heredity and environment in the formation of human character, both physical and mental. Illustrations of fundamental truths, applicable to classroom and social problems, presented in the form of charts, diagrams, lantern slides, and demonstration material from breeding experiments. Persons who contemplate taking this course should first consult with Dr. O. E. White, either personally or by mail. *Saturdays,* at 10 a. m., *November 4–December 2.* Dr. White.

N.B. Courses C1–C9 inclusive, are open free to the public unless otherwise specified. Those planning to take any of these courses are asked to register at the Garden at least one week before the course opens, so that adequate arrangements may be made for materials, etc. They are open to both men and women, *but no course will be given to a class of less than six.*

D. Advanced Courses and Investigation

For the following advanced and research courses there is a charge covering all expenses, including laboratory fee, of *$30 for each full course* of 100 credit hours, and *$20 for each half course* of 50 credit hours.

Advanced Courses

D1. Mycology and Plant Pathology.—Morphology and pathology of the fungi and bacteria. Life histories of fungi; methods of control of plant diseases, etc. Prerequisite, a satisfactory college course in general botany. 100 credit hours of work. Hours to be arranged. Dr. Olive and assistant.

D2. Fresh-Water Microbiology.—A course of lectures, recitations, and laboratory work on the various organisms found in drinking water. Odors, colors, etc., of drinking water; methods of microscopical and bacteriological examination. 50 credit hours of work. Hours to be arranged. Dr. Olive and assistant.

D3. Cytology.—A course of lectures and laboratory work on cell physiology and cell morphology. Methods of cytological technique, and practice in accurate interpretation of cell phenom-

ena. Prerequisite, satisfactory college courses in general botany and plant physiology. 100 credit hours of work. Hours to be arranged. Dr. Olive and assistant.

D4. Experimental Evolution.—Detailed studies of the nature and causes of variation and heredity. Some of the subjects considered are: Historical Resumé of the Evolution Theory, Physical Basis of Inheritance, Inheritance of Acquired Characters, Kinds and Causes of Variation, Mendelism, Biometry, Principles and Technique of Plant Breeding. This course is open to students of college rank with a knowledge of the elements of physics, chemistry, geology, botany, and zoology. The work is primarily intended for students in pure science, and for agricultural or horticultural students fitting themselves for various professional activities in these particular fields. Three lectures and two laboratory periods a week. 100 credit hours of work. Hours to be arranged. Dr. White.

D5. Phytogeography.—A course dealing with plant distribution over the earth. Prerequisites are courses in plant ecology and geology, and a good general knowledge of climatology and systematic botany. 50 credit hours of work. Hours to be arranged. Mr. Taylor.

D6. Seminar and Journal Club.—A bi-weekly meeting of the Garden Staff and advanced students, for the discussion of fundamental problems of botany or of general biology, and for the review of pertinent botanical literature. Open to others on invitation.

Graduate Study and Botanical Research

D7. Research in Plant Physiology.—Independent investigation of problems dealing with plant functions. Thesis. Dr. Gager.

D8. Research in Mycology and Plant Pathology.—Independent investigation of problems in fungi and fungous diseases of plants. Dr. Olive.

D9. Research in Plant Genetics.—Independent investigation of problems of variation and heredity, including that phase of cytology having a direct bearing on the subject matter of genetics. Dr. White.

Cooperation With Local Schools

1. Talks at Schools.—The principals of any schools, public or private, may arrange with the director to have lantern talks given at the schools on various topics related to nature study, such as garden work with children, tree planting, and Arbor Day. If an illustrated lecture is desired, the lantern and operator must be provided by the school, but slides will be furnished by the Botanic Garden. Principals may address the Curator of Elementary Instruction for list of talks and for appointments.

2. School Classes at the Garden.—(*a*) Schools not provided with stereopticon may arrange for their classes, accompanied by their teachers, to come to the Botanic Garden. At present, not more than 70 children can be accommodated at any one time.

(*b*) Notice of such a visit should be sent at least two days previous the date on which a talk is desired. These talks will be illustrated by lantern slides, and by the conservatory collection of useful plants from the tropics and subtropics. Spring and fall announcements of topics will be issued during 1916.

(*c*) The Garden equipment, including greenhouse, plant material, lecture room, lantern, and slides, is at the disposal of teachers who desire to instruct their own classes at the Garden. Arrangements must be made in advance with the Curator of Elementary Instruction, so that such work will not conflict with regular classes and lectures.

(*d*) The principal of any secondary school in Brooklyn may arrange also for a series of ten lessons on plant culture to be given during the fall to a class. These lessons will be worked out for the most part in the greenhouse. Such a course must be arranged for in advance, and the class must be accompanied by its teacher.

3. Home Gardening.—Assistance will be given to children in planning and planting home gardens. Enrollment cards for such assistance may be had on application to the Curator of Elementary Instruction. Prizes will be offered to both schools and individuals, at the annual Children's Garden Exhibit, for the best results in home gardening. This exhibit is open to all children in the City of Brooklyn, although their garden products may have

been raised at their summer homes. *Certifications must be made that the work has been done by the child himself.*

The exhibit for 1916 will be held on the 29th and 30th of September. All exhibits, of schools as well as of individuals, must be brought to the Brooklyn Botanic Garden on the afternoon of September the 28th, or by 10 o'clock on the morning of the 29th. The exhibits will be judged on the afternoon of the 29th, and will then be on exhibition for the public from three to five o'clock on the afternoon of the 29th, and from ten in the morning until four in the afternoon of the 30th. The announcement of prizes will be made on the 30th. After four o'clock of this day, exhibitors may remove their exhibits. Prizes will be distributed on Saturday afternoon, October 14, at three o'clock.

Silver and bronze medals will be awarded as first and second prizes for individual exhibits. A bronze statute of Victory is the first prize for the school making the best exhibit as a whole. This prize is to be competed for annually until one school wins it three times, when it will become the property of that school. A new prize will then be offered. This statue is now in possession of P. S. 152, this school having won it twice, at the first and second annual Children's Garden Exhibits. The second prize is a silver cup, which is retained by the winning school.

4. Penny Packets of Seeds.—In order to assist the above work, penny packets of seeds are put up by the Botanic Garden, for children's use. In the early spring, lists of these seeds, conditions for entry as an exhibitor, home gardening record cards, and other information may be had no application to the Curator of Elementary Instruction.

5. Conferences.—Conferences may be arranged by teachers and principals for the discussion of problems in connection with gardening and nature-study. Monday and Saturday afternoons are usually available for this purpose. Appointments must be made in advance. Address Miss Ellen Eddy Shaw.

6. Study and Loan Material.—On request, the Garden will endeavor to provide living seedlings or plant parts for study, to the extent of our limited facilities. Teachers may arrange to have

various physiological experiments or demonstrations conducted at the Garden. Petri dishes, which must be cleaned and delivered to the Garden, will, on request, be filled with nutrient agar, ready for exposure in the study of bacteria and molds. In all cases arrangements must be made by teachers for calling for such material, and all material loaned by the Garden must be returned promptly in good condition.

Docentry

Classes, and other parties of several persons, wishing to view the plantations under guidance, may arrange with the Curator of Public Instruction for appointments with a docent to conduct them through the Garden. For this service there is a charge of 25 cents an hour or fraction thereof, or 10 cents a person for parties of three or more; except that no charge is made for teachers with classes, nor to members of the Botanic Garden.

The Herbarium

The Garden herbarium consists at present of over 100,000 specimens, including phanerogams, ferns, mosses, liverworts, lichens, parasitic and other fungi, algæ, and myxomycetes. This collection may be consulted by those interested, and specimens submitted will be gladly identified. Address Curator of Plants.

The Library

The rapidly growing library of the Garden occupies temporary quarters on the main floor of the laboratory building. This is not a circulating library, but is open free for consultation to all persons, from 9 a. m. until 5 p. m. Over 200 current periodicals devoted to botany and related subjects are regularly received.

COLONEL WOODWARD AND THE BROOKLYN GARDEN*

The speaker became a resident of Brooklyn so comparatively recently that the memory of first impressions is still vivid. Among

* Remarks by the director of the Garden, at the meeting in memory of Col. Robert B. Woodward, at the Academy of Music, Brooklyn, October 31, 1915.

these impressions was the realization that Brooklyn has been unusually favored in the large number of public-spirited citizens for whom the welfare of the city has always been a matter of prime importance; they have given freely of their time, their money, and their ability in order to make Brooklyn a better place to live in.

All of this work has been without ostentation, much of it has been practically anonymous. Our citizens freely enjoy daily many opportunities for education and culture and wholesome recreation without having the slightest idea to whom they are indebted for such privileges, or indeed that they are indebted to any private individuals at all. Herein lies Brooklyn's real justification for civic pride; not in her parks, her hospitals, her charity organizations, her libraries, her schools, her Institute, her museums, her art gallery, her botanic garden, but in the splendid body of citizens whose interest in and devotion to the public welfare have made these institutions possible.

One of the leaders of this group was the man in honor of whose memory we are assembled this afternoon. The details of his life and his public services have been reviewed in the well-merited tribute of the afternoon's chief address; the chairman of the meeting has spoken of his sterling qualities as a man and a friend; his invaluable benefactions to the Department of Education and to the Museum of the Brooklyn Institute of Arts and Sciences have been ably recounted, and I esteem it a great privilege to add a brief word of tribute in recognition of his interest in the Brooklyn Botanic Garden, and his generous support of this newest department of the Institute's activities.

The establishment of a public educational and scientific institution requires something more than money; those who have immediate charge of the conduct of its affairs, however efficient they may be, require the sympathetic support of the public in the work they endeavor to accomplish. One could always count on Col. Woodward for such support. This was shown, among other ways, by the frequency with which he visited the Garden, and I recall with satisfaction one or two of his visits when he found the director somewhat discouraged because the development of the Garden had not been able to make more rapid progress; his words of counsel at such times made it impossible not to view things in

a truer perspective, and thus brought the most substantial kind of encouragement.

The last time I ever saw Colonel Woodward was last July, when he took the director of the Brooklyn Museum and the director of the Botanic Garden with him to Cold Spring Harbor, Long Island, to confer with the director and one of the board of managers of the Biological Laboratory of the institute located at that place. The object of that visit was in the interest of bringing about a closer articulation between the biological laboratory and the other departments of the institute. As has before been said, the welfare of the institute amounted to a passion with Colonel Woodward, and no one realized more fully than he the absolute necessity of solidarity for the largest success of such an institution.

He was essentially an optimist. At the last annual inspection of the Garden by the trustees he overheard someone inquiring where he was, and replied, "Here he is, enjoying the good things of life as usual." But to enjoy the best things in life himself was never enough; he was ever actively interested in securing such advantages for others, and this altruistic habit of mind was the mainspring of his philanthropies.

His estimate of values was not limited by his own attainments. On one occasion he said to the speaker, in substance, "I don't know anything about botany, but I believe the work you are trying to do at the Botanic Garden is worth doing, and that a botanic garden is a desirable thing for any city to have." Its value as a public institution was sufficient reason in his mind for supporting it. One cannot help here but note the contrast between such a largeness of view and the more restricted vision of those who regard, or profess to regard, museums and art galleries, zoological parks, and botanic gardens, as luxuries and frills, and who question the propriety or desirability of supporting them, even in part, by public taxation.

The life of Colonel Woodward was a living protest against such a point of view. In the work of the Brooklyn Botanic Garden, as elsewhere and always, his gifts were generous and timely, his sympathy was intimate and helpful, his optimism, contagious and leavening. We honor ourselves in this public recog-

nition of his services; to have known him was a rare pleasure; fortunate the city of his citizenship.

C. STUART GAGER.

GRADUATION OF GARDEN TEACHERS

The annual graduation exercises of teachers of children's gardening was held December eleventh, at three o'clock, in the laboratory building of the Botanic Garden. The course leading to a certificate in children's gardening covers one year's study, including a summer's teaching in a children's garden. Last November the first class of seven students received certificates. The enrollment in this course is now forty, but only four students received certificates this year. The members of the class are Mrs. Engerie Coles McCord, Miss Johanna L. Becker, Miss Maud E. Snedeker, all of Brooklyn; and Miss Elsa C. Wolf, of Indianapolis.

Miss Alice Fitts, director of the Kindergarten Department of Pratt Institute, spoke to the graduates on "The value of gardening to the child." The graduates of the class of 1914 presented a sundial, as a gift from them to the Botanic Garden. This is to be set up in the new children's plot. Mrs. LeRoy Barton presented the gift on behalf of the class.

At the close of the exercises a reception was given in the Library to the graduating class by the Garden Teachers Association of the Brooklyn Botanic Garden. Miss Lenda Hanks, of the Girls High School, and Miss Harriet Porrit, of P. S. No. 130, Manhattan, members of the Association, poured.

E. E. S.

DOCTORATES IN BOTANY CONFERRED BY AMERICAN UNIVERSITIES IN 1915

According to the list published in *Science* N. S. **42**: 555–565 Oct. 22, 1915, there were 40 doctorates given in botanical subjects by American universities during 1915; chemistry again leading all other subjects with 85 degrees, while botany comes second, and zoology third.

As with previous lists published in the RECORD (1: 105; 2: 121; 3: 123), it has been difficult to differentiate certain titles which might well be classified as botanical, although doubtless some of them were probably presented in departments of agriculture, or of physiological chemistry.

The subjects of these doctorate theses in botany for 1915 were as follows:

UNIVERSITY OF CHICAGO

Hanna Caroline Aase: "Vascular anatomy of the 'Megasporophyll' in conifers."

Joseph Stuart Caldwell: "A study of the effects of certain antagonistic solutions upon the growth of *Zea Mays*."

Hermann Bacher Deutsch: "Effect of light upon the germination of the spores of the true ferns."

James Frederick Groves: "Life duration of seeds."

Andrew Henderson Hutchinson: "Fertilization in *Abies balsamea*."

James Palm Stober: "A comparative study of winter and summer leaves of various herbs."

HARVARD UNIVERSITY

Guilford Bevil Reed: "Studies in plant oxidases."

William Henry Weston, Jr.: "On the development of *Thraustotheca*, with a comparative examination of *Dictyuchus*."

COLUMBIA UNIVERSITY

Arthur Percival Tanberg: "Experiments on the amylase of *Aspergillus Orygal*."

CORNELL UNIVERSITY

Elmer Eugene Barker: "Heredity studies in the morning glory (*Ipomea purpurea*)."

Harry Phillip Brown: "Growth studies in forest trees."

Leonard Amby Maynard: "The fixation of nitrogen by sweet clover."

George Adin Osner: "Leaf smut of timothy."

William Jacob Robbins: "Digestion of starch by *Penicillium camemberti*."

Joseph Rosenbaum: "The Phytophthora disease of ginseng."
Constantine Demetry Sherbakoff: "Fusaria of potatoes."
James Kennith Wilson: "Physiological studies of *Bacillus radicicola* of soy bean (*Sojus max* Piper) and of factors influencing nodule production."

THE JOHNS HOPKINS UNIVERSITY

John Wesley Shive: "A study of physiological balance in nutrient media resulting in a simplified culture solution for plants."

YALE UNIVERSITY

Isaac Faust Harris: "Chemical and physiological studies of the castor bean and soy bean."
Henry Daggett Hooker, Jr.: "Thermotropism and hydrotropism."

UNIVERSITY OF ILLINOIS

Demetrius Ion Andronescu: "The physiology of the pollen of *Zea Mays* with special regard to vitality."
George Leo Peltier: "Parasitic Rhizoctonias in America."
Frank Archibald Wyatt: "The influence of calcium and magnesium compounds on plant growth."

UNIVERSITY OF CALIFORNIA

Helen Margaret Gilkey: "A revision of the Tuberales of California."
Richard Morris Holman: "The orientation of terrestial roots with particular reference to the medium in which they are grown."
Harry Stanley Yates: "The comparative histology of certain California Boletaceae."

UNIVERSITY OF MICHIGAN

George Herbert Coons: "A study of the factors involved in the growth and pycnidia formations of *Plenodomus Fusco-Maculans*."
Adrian John Pieters: "The relation between vegetative vigor and reproduction in some Saprolegniaceae."

UNIVERSITY OF PENNSYLVANIA

John Young Pennypacker: "Observations on the beach plum: a study in plant variation."

David Walter Steckbeck: "Comparative histology and irritability of sensitive plants."

Heber Wilkinson Youngken: "The comparative morphology, taxonomy and distribution of the Myricaceae of the eastern United States."

WASHINGTON UNIVERSITY

Alva Raymond Davis: "Enzyme action in the marine algae."

William Harrison Emig: "The occurrences in nature of certain fungi pathogenic for man and higher animals."

Joseph Charles Gilman: "Cabbage yellows and the relation of temperature to its occurrence."

Melvin Clarence Merrill: "The electrolytic determination of exosmosis from the roots of plants subjected to the action of various agents."

Lee Oras Overholts: "Comparative studies in the Polyporaceae."

INDIANA UNIVERSITY

Fermen Layton Pickett: "*Arisaema triphyllum:* a biological study."

UNIVERSITY OF NEBRASKA

Richard Hans Boerker: "Ecological investigations with certain forest trees."

Clarence Jerome Elmore: "The diatoms (Bacillarioideae) of Nebraska."

CATHOLIC UNIVERSITY

Daniel Da Cruz: "A contribution to the life history of *Lilium tenuifolium*."

E. W. O.

NOTES

Thirteen bids were received by the Board of Park Commissioners on October 28, 1915, for the completion of our laboratory building and plant houses. The lowest bidders for general construction were Frymier & Hanna, $140,228.00, for heating and ventilating, Adams Britz Company, $16,928.00, and for plumb-

ing, C. Nally, $7,569.00. The contract with Frymier & Hanna was executed by the contractor on November 29, and excavation for the foundation began on December 1.

The first bunch of bananas to be grown at the Garden was harvested on October 23, and specimens were sent to trustees and members of the various staffs of the Institute, and to other friends of the Garden. There were over 250 bananas on the bunch, and the total weight was 170 pounds.

The New York Section of the National Nature Study Association met at the Garden on October 30, at 10:30 a. m. At the close of the business session a brief address was given by the director on the aims and work of the Garden, the relation of botanic gardens to nature study in the schools, and the desirability of establishing botanic gardens more generally in American cities. At the close of the session the members were conducted through the conservatories and the Japanese Garden.

Among recent visitors to the Garden was Dr. H. Terao, botanist of the Imperial Agricultural Experiment Station, Tokio, Japan, who called on November 10. Dr. Terao plans to spend the remainder of the academic year at the Bussey Institution, Harvard University, investigating problems in plant breeding. He was very favorably impressed with our Japanese Garden, pronouncing it the most perfect one he had seen in America.

Owing to the prolonged season of Indian summer, many species of plants remained in bloom out of doors until as late as November 15.

On Tuesday afternoon, December 7, a meeting of the New York City Federation of Women's Clubs was held at the Children's Museum, Brooklyn, to consider the topic, "What our city is doing for children." The speakers were Mrs. Janet D. Cheney, chairman of the art department of the Washington Irving high school, New York, Dr. C. Stuart Gager, director of the Brooklyn Botanic Garden, Mrs. John Francis Yawger, New York City, Mrs. Henry D. Annable, chairman of the Alliance of Women's Clubs of Brooklyn, Miss Anna B. Gallup, curator of the Chil-

dren's Museum, and Mr. Orrin C. Cox, of the Board of Censorship of Motion Pictures, of the People's Institute. The meeting was under the chairmanship of Mrs. John J. Schoonhoven.

The members of the first class to complete the course for the preparation of teachers of children's gardens have organized the Garden Teachers Association of the Brooklyn Botanic Garden. The objection of the association is primarily to further the children's garden work at the Botanic Garden. All students who hereafter complete the course are eligible to active membership. At the exercises marking the close of the second season of the children's gardens, held on September 24–25, 1915, the association awarded a bronze cup as a special prize to the child who had done the most satisfactory work in our children's gardens for two consecutive years.

On December 15 the director of the Garden addressed the Rhode Island Horticultural Society, at Providence, on the effects of electricity and radium rays on plants.

The first souvenir post cards to be issued by the Garden, comprising eleven views of the Japanese garden in both summer and winter, were placed on sale during December, 1915. They may be had in photo prints at five cents each, and in half-tone reproductions (like the frontispiece in this issue of the RECORD), at two for five cents. A double card, showing a panoramic view of the entire Japanese garden, may be had for ten cents in photo print, and five cents in half-tone reproduction.

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PUBLICATIONS

OF THE

BROOKLYN BOTANIC GARDEN

RECORD. Established January, 1912. An administrative periodical, issued quarterly. Contains, among other things, the annual report of the director and heads of departments, special reports, announcements of courses of instruction, miscellaneous papers, and notes concerning Garden progress and events. Free to members of the Garden and of the Department of Botany of the Institute. To others one dollar a year; 25 cents a copy.

CONTRIBUTIONS. Papers originally published in botanical or other periodicals, reissued as "separates," without change of paging, and numbered consecutively. This series includes occasional papers, as well as those embodying the results of research done at the Garden, or by members of its staff or students. Twenty-five numbers constitute one volume. Price 25 cents each, $5.00 a volume.

1. *The educational work of botanic gardens.* 13 pages. 1911.

2. *The purpose of an introductory course in botany.* 8 pages. 1911.

3. *Cryptomeric inheritance in Onagra.* 11 pages, figs. 2; plates 2. 1911.

4. *On the origin and present distribution of the pine-barrens of New Jersey.* 15 pages, figs. 2. 1912.

5. *Ingrowing sprouts of Solanum tuberosum.* 10 pages, figs. 6; plate 1. 1912.

6. *Intermingling of perennial sporophytic and gametophytic generations in Puccinia, P. obtegens and Uromyces Glycyrrhizae.* 15 pages, 1 plate. 1913.

7. *Studies of teratological phenomena in their relation to evolution and the problems of heredity. I. A study of certain floral abnormalities in Nicotiana, etc.* 14 pages, figs. 4. 1914.

8. *Some observations on the formation of the capillitium and the development of Physarella mirabilis Peck and Stemonitis fusca Roth.* 15 pages, 2 plates. 1914.

9. *The growth-forms of the flora of New York and vicinity.* 9 pages. 1915.

GUIDES to the collections, buildings, and grounds. Price based upon cost of publication.

1. *The Brooklyn Botanic Garden.* Price, 5 cents.

LEAFLETS. Established April 10, 1913, and published weekly or biweekly during April, May, June, September, and October. The purpose of the Leaflets is primarily to give announcements concerning flowering and other plant activities to be seen in the Garden near the date of issue, and to give popular, elementary information about plant life for teachers and others. Current numbers free to all who wish them. Back series complete, 50 cts. each; back numbers, 5 cts. each.

SEED LIST. Issued in December of each year.

AMERICAN JOURNAL OF BOTANY. Established, January, 1914. Published, in cooperation with the BOTANICAL SOCIETY OF AMERICA, monthly, except during August and September. Subscription rates: to members of the Botanical Society of America, $3.00 a year; to all others $4.00 a year.

BROOKLYN BOTANIC GARDEN

RECORD

VOL. V APRIL, 1916 No. 2

EDITED BY

C. STUART GAGER

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DR. EDGAR W. OLIVE, *Curator of Public Instruction*

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————————, *Garden Aid*

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OLMSTED BROS., *Landscape Architects*

THE BROOKLYN INSTITUTE OF ARTS AND SCIENCES

BROOKLYN BOTANIC GARDEN

RECORD

VOL. V April, 1916 No. 2

FIFTH ANNUAL REPORT OF THE BROOKLYN BOTANIC GARDEN, 1915

REPORT OF THE DIRECTOR

TO THE GOVERNING COMMITTEE OF THE BOTANIC GARDEN:

Gentlemen: I have the honor to submit herewith the fifth annual report of the Brooklyn Botanic Garden, of the Brooklyn Institute of Arts and Sciences, for the year ending December 31, 1915.

Five Years of Development

Historical.—The thirtieth of June, 1915, marked the close of our first five years of development. The Brooklyn Botanic Garden came into legal existence with the execution of the first agreement between the City of New York and the Brooklyn Institute concerning the Garden. This agreement was signed, on behalf of the City, by Mayor George M. McClellan, on December 28, 1909, four days before he retired from office; but the appointment of the first director did not take effect until six months later, namely July 1, 1910.

Aims and Results.—One of the first duties of the director was to prepare, at the request of the Committee on Botanic Garden, a plan of development for the first five years. The plan provided for an organization to be realized at the end of that period

comprising, in addition to the director, a staff of eight of the rank of curator (including the librarian) and assistant curator, a secretary, head gardener, three gardeners, a photographer, and the usual assistants for such a staff, in addition to an engineer, fireman, night watchman, and day laborers. For the realization of the plan it was anticipated that the budget for maintenance for the fifth year would be $36,960.

It has been possible for the Garden to realize the program laid down with only minor changes. The municipal appropriation for maintenance for the fifth year (1915) was $37,124.50—less than two hundred dollars in excess of the amount anticipated. The city appropriation for maintenance has been supplemented by generous donations of private funds, in addition to those provided for the building up of our collections, and the prosecution of research, and this has made it possible for us to accomplish somewhat more than was initially planned.

From an existence wholly on paper on January 1, 1910, and a staff of one in temporary quarters on July 1, 1910, the Garden has grown to a scientific staff of twelve, occupying a portion of its own building and plant houses, with a monthly pay roll of 29 persons, and a weekly pay roll averaging nearly 14 persons during the open season, with nearly 50 acres of land, an endowment over one half as large again as the original amount, a rapidly growing library of nearly 4,000 volumes and nearly 6,000 pamphlets, a steadily increasing herbarium of over 110,000 specimens, plantations comprising nearly 3,500 species, and other scientific collections, and real estate having an assessed valuation of over $2,700,000.

The Garden as a Public Institution

Obligation to the Public.—The purpose of a botanic garden is the increase and diffusion of a knowledge and love of plants, and a garden supported in large part by public taxation is under special obligation to render to the general public—to *all* the people—as large a measure of direct returns as possible, consistent with the entire purpose and best interests of the institution.

Ways of Serving the Public.—This obligation may, to a large

extent, be discharged by laying suitable emphasis on the second half of the aim just stated, namely the *diffusion* of a knowledge and love of plants; and this is accomplished by labeled collections, indoors and out, by popular lectures and publications, by courses of instruction in various branches of botany, by giving, without charge, information on all phases of plant life, and by cooperation in various ways with the instruction in geography, nature study, and botany in the public and private schools of the City.

From the broad standpoint of general education and culture, and as one of the most potent influences in arousing in the people an enthusiasm for the ideal of a city beautiful, one can hardly imagine anything more effective than to create and foster a knowledge and love of plant life, in all its varied phases.

A publicly supported botanic garden is also in a position to give reliable information to the department of parks on the care of trees and shrubs in streets and parks, and especially on the treatment and prevention of destructive diseases to which they are subject.

Our own Garden, through its department of public instruction, and otherwise, has been able to render such services, and to meet increasing demands for them on the part of the public. Now that the Garden is becoming better known in the City, requests for information and advice are of almost daily occurrence. Our distribution of seeds to school children, and the children's gardens may be mentioned as two of the numerous ways in which the Garden meets a variety of public needs.

A botanic garden is, moreover, of special benefit in a large city by the mere fact of being a garden or park, thereby offering an additional breathing space, and a place of natural beauty where one may keep in touch with growing things, and retire from the noise and dust and confusion of the city streets; in fact it ministers in a unique way to the educational, aesthetic, and recreational needs of a city population.

The Garden as a Scientific Institution

Need of Investigation.—But a botanic garden that confined its activities merely to the diffusion of knowledge already known

would not only fail to make the most of its opportunities, it would thereby greatly restrict its usefulness and efficiency. The assembling and proper care of a large collection of plants, native and exotic, demands a staff of highly trained and experienced specialists in botany and horticulture; men who are not only possessed of such knowledge of plant life as has already been ascertained, within the range of their special interests, but who are competent and desirous of extending our knowledge of plants. Much of this new knowledge (*e. g.*, in plant pathology and plant breeding) may become immediately applicable in the care of our collections and otherwise, some of it may find its so-called "practical" use only later; but one can never tell when some bit of reliable scientific information may become of the utmost importance in our daily affairs; research, therefore, should not be restricted to what may seem, in advance, to be useful or usable. Certain it is that if a botanic garden is to be more than a park, if it is to be in reality a scientific institution, it must be administered by men who are not only competent to extend the boundaries of our knowledge, but whose services cannot be secured and retained unless time and opportunity are given for such work.

It can hardly be overemphasized that, however valuable the diffusion of popular information may be, and however appropriate as a function of an institution supported in whole or in part by public money, the work of extending the limits of our knowledge is vastly more important, for it is fundamental to the former activity, vitalizing both it and those engaged in it. Said President Butler in his last annual report to the trustees of Columbia University: "So long as the spirit of research dominates the university and is its major interest, just so long will its teaching be kept fully alive and just so long will its public service be real and vitalizing. To organize and to stimulate research, therefore, is the university's chief business."

The same is equally true of a botanic garden which aims to be an educational and scientific institution; its public service will be real and vitalizing and its teaching fully alive so long, and only so long, as it is dominated by the spirit of investigation, and the members of its staff are actively engaged in scientific research.

The plan of our building, approved by the trustees and the

municipal authorities, includes a number of private *research rooms,* in addition to other features having the same implication. It is anticipated that, within one year from the publication of this report, we shall be occupying the completed building. Plans should be developed at once for putting the building to the full uses for which it is intended.

Our work of popular education is now thoroughly organized; that it will move forward by both pushes and pulls, as well as by a well-developed momentum of its own, is now assured; our danger to guard against is a smug contentment in feeling that we are accomplishing our full duty and making the most of our opportunities by only this. The director, therefore, urges upon the Committee that, from the standpoint of the fundamental welfare and vitality of the Garden, no more important problem will be before us during the next five years, than the organization here of botanical research, and making ample provision for its support. This Garden, with its strategic location and the unsurpassed equipment it will shortly possess, should become one of the recognized centers of botanical investigation in the United States.

Public Support of Research.—That scientific research—the extension of knowledge for its own sake as well as for its practical applications—should receive public support is self-evident to those who have given thoughtful consideration to the matter. This is not the place to present the evidence *in extenso,* but a passage from Louis Agassiz, one of our greatest citizens, as well as one of the world's greatest scientists, may appropriately be quoted in this connection:

"And let me say that the community should foster the purely intellectual efforts of scientific men as carefully as they do their elementary schools and their practical institutions, generally considered so much more useful and important to the public. From what other source shall we derive the higher results that are generally woven into the practical resources of our life, except from the researches of those very men who study science, not for its uses, but for its truth."

Appropriation for Additional Building

The most important event during the year, and in fact during the entire history of the Garden, was the provision last spring, by private gift and city appropriation, of the sum of $200,000 to make possible the completion of our buildings, and other permanent improvements. The events leading up to this were as follows:

The contract for the erection of the first sections of the laboratory building and plant houses was let on January 18, 1912, a little over two years after the execution of the agreement (December 10, 1909) between the City and the Institute providing for the establishment of the Garden, and a year and a half after the appointment of the first director. Owing to exasperating delays, these sections, comprising only one fifth of the laboratory building and about one sixth of the plant houses, were not completed until the latter part of September, 1913, one year and eight months after the ground was broken.

These first sections were considerably outgrown by the work of the Garden before they were occupied, but difficult adjustments were cheerfully made, in the expectation that funds for additional sections would be provided by the City within a few months. In response to the growing needs of the Garden and the demands of the public, the staff increased from four (its maximum number during the occupation of temporary quarters in the Museum Building) to twelve; the library and herbarium entirely outgrew their temporary quarters, collections of exotic living plants continued to be received by gift and otherwise until the small plant houses were congested to the extreme limit; herbarium and filing cases, desks and storage shelves overflowed into the hall and up into the small attic. The public office with two desks, two occupants, iron safe, and filing cabinets continued to occupy a room seven feet by eleven, intended originally as a private research room for one person.

In fact, by May, 1915, a year and a half after the first section was occupied, over three years after it was begun, and five years, lacking one month, after the first director entered upon his duties, the situation had become impossible. The Garden could make

no further progress in any direction; stand still we could not—we must either advance or go backwards.

Meanwhile unprecedented conditions throughout the world, aggravated by the European war, the drain upon the finances of the city, owing to the enormous cost of subway construction and to other things, all combined to postpone any action by the Board of Estimate and Apportionment on our request for an appropriation of $128,000 for the construction of two additional sections of the building and plant houses (leaving two for later construction). The request was before that body without action for over one year from January 23, 1914.

Early in April the situation and the outlook were thoroughly reviewed at a conference between the chairman of the Committee on Botanic Garden and the Director, and on April 26, 1915, the chairman, Mr. Alfred T. White, sent the following communication to the City Comptroller:

"April 26, 1915.

Hon. William A. Prendergast, *Comptroller,*
New York City.

Dear Sir:

The Brooklyn Botanic Garden comprises about forty acres of Park lands adjacent, as you know, to Prospect Park. Although these grounds have been owned by the City for fifty years, they have been practically little used by the people of Brooklyn until the Botanic Garden was initiated, in December, 1909, through the lease of the lands to the Brooklyn Institute of Arts and Sciences for that purpose. The assessed valuation of the land is over $2,000,000, and the City has appropriated $170,000 of corporate stock for improvement of the grounds and buildings. This amount has been expended in doing most of the necessary grading, a part of the top-soiling, the construction of the most necessary walks and the erection of the first sections of the instruction building and plant houses. These sections cannot, however, be used for the purposes for which they were intended without the completion of the buildings. It also remains to complete the grading and soil improvement, the construction of a considerable length of fence, gates and turnstiles, some additional walks and much needed propagating houses.

After reviewing careful estimates of the cost of the above work, I believe that it can be accomplished for $200,000; and realizing the many directions in which the City is being pressed for the issue of corporate stock, I desire to propose to the Corporate Stock Committee that if the City shall contribute half of the sum necessary for this expenditure, say

$100,000, I will undertake to raise by private contributions an equal sum, so that the grounds and buildings may be progressed rapidly to completion.

These expenditures will, in my judgment, obviate the necessity of asking further issues of corporate stock for several years. They will enable us to meet the demands from the public schools for the classes of children who desire to study at the Garden, which we are now unable to meet, and will also serve to complete and throw open the entire Garden for the recreation of the general public; in other words, will make the whole of the large investment of the City available for the public good.

Very respectfully yours,
(Signed) ALFRED T. WHITE."

The reply of the Comptroller, under date of May 6, 1915, was as follows:

"MAY 6, 1915.

MR. ALFRED T. WHITE, *Chairman,*
Committee on Botanic Garden,
Brooklyn Botanic Garden,
Brooklyn, New York.

Dear Sir:

At a meeting of the Corporate Stock Budget Committee yesterday, the proposition contained in your letter of April twenty-sixth regarding the completion of the Brooklyn Botanic Garden work was considered.

I have been authorized to say to you that the Committee will accept the proposition you have made; it is understood that $200,000 will complete the work. I will be very glad indeed to discuss with you further details of this matter.

Very truly yours,
(Signed) WM. A. PRENDERGAST,
Comptroller."

A letter of May 11, 1915, from Mr. White to the Comptroller, in reply to his communication of the sixth, contained the following paragraphs:

"Referring to my letter of April 26th and your favor of May 6th in reply thereto, I am pleased to inform you that I have secured by private subscription One Hundred Thousand Dollars ($100,000), to be given to the City towards the completion of the buildings and other development of the Brooklyn Botanic Garden, on the understanding that the City will appropriate an equal amount of corporate stock for a similar purpose. I shall be prepared to collect and turn over to you the entire contribution from private sources at any time you may request.

Although almost the entire sum of $200,000 will be needed for the com-

pletion of the buildings, I trust there will be some small portion available for the improvement of the grounds, and therefore would suggest, if agreeable to you, that the fund might be given the general designation of Brooklyn Botanic Garden Improvement Fund, which would, I presume, make it available for either purpose. . . .

Let me repeat the assurance already given you, that no further issues of corporate stock will be asked on behalf of the Brooklyn Botanic Garden during the term of the present administration."

The check for $100,000, contributed on behalf of the Brooklyn Institute of Arts and Sciences, by the chairman of the Committee on Botanic Garden and by the two donors of the original endowment of the Garden, was transmitted to the Comptroller on May 26, 1915.

The report of the Committee on Corporate Stock Budget, of the Board of Estimate and Apportionment, recommending the issue of $100,000 corporate stock is recorded in the minutes of the meeting of the Board for June 11, 1915. Under Rule 19 the matter was laid over for one week, the resolution to authorize the appropriation of $100,000 being passed by the Board of Estimate and Apportionment on June 18, 1915; a certified copy of the resolution was transmitted to the Board of Aldermen on June 22, 1915, with a recommendation for adoption, and was adopted by the Board on July 6, 1915. The resolution was approved by the Mayor on July 16, 1915.*

In the meantime the original plans for the laboratory building were carefully reconsidered and fundamentally revised in the light of five years of actual experience. Although the disadvantage of the long delay in the completion of the building can hardly be exaggerated,† still there was some advantage, for the building as now planned will not only be better suited to our needs, but will contain more room than was originally intended, owing to the decision to excavate under the entire structure north of the central pavilion.

The matter of revision of plans et cetera was referred to the Governing Committee of the Botanic Garden with power, by the Board of Trustees on June 10, 1915, and final plans and specifi-

* See Appendixes 5–7.

† The situation was presented in detail in the preceding Annual Report, Brooklyn Botanic Garden Record 4: 41–43. Ap 1915.

cations were approved by the Board of Estimate and Apportionment of the City on September 24.*

Bids for the contract were opened on October 28 from the following firms, and excavation began on December 1. The official time began on December 20, and the specifications call for the completion of the work within 300 working days.

LIST OF BIDS FOR THE COMPLETION OF THE BOTANIC GARDEN BUILDINGS

General Construction

1. Frymier & Hanna Co., N. Y. C. (lowest)	$140,228
2. Thos. McKeown, Inc.	147,235
3. P. F. Kenny Co.	155,000
4. John T. Brady & Co.	155,480
5. Thos. J. Walters Co.	156,956
6. H. C. Stowe Const. Co.	159,580
7. P. J. Carlen Const. Co.	166,600
8. William Werner	166,986
9. T. A. Clarke Co.	169,300
10. J. Krease Co.	171,400
11. W. H. Egan	171,871
12. Marble Arch. Co.	174,000
13. Emerson Bldg. Co.	186,000

Heating

1. Adams Britz & Co. (lowest)	$ 16,928
2. Johnston Heating Co.	17,750
3. Teran, Mahaney & Munro	17,975
4. Wells & Newton	19,681

Plumbing

1. C. Nally (lowest)	$ 7,569
2. P. F. Kenny	7,890
3. Jas. Harley Plumbing Co.	7,991
4. J. J. Kenny	8,358
5. Jas Harley	8,440
6. S. Ritterhous	8,596
7. Chas. Williams	8,998
8. Wells & Newton	9,291
9. E. J. Belford	9,488
10. Jas. Armstrong	9,900

* See Appendix 8.

Total Amount of Lowest Bids

General Construction	$140,288
Heating	16,928
Plumbing	7,569
	$164,725
Architects' and Engineers' Fees	7,500
Total	$172,225

New Walks.—On March 5, the Board of Estimate and Apportionment approved plans and specifications of Olmsted Bros., for the construction of walks and drainage on the south addition, opposite the Willinck entrance to Prospect Park, in the sum of $4,350, to be paid out of a balance of $5,012 on city appropriation C.D.P. 200K for the construction of walks. These walks, of bituminous macadam, are so arranged as to facilitate direct passage across the property between Washington and Flatbush Avenues, in accordance with the terms of the agreement of August 17, 1914, by which the land was transferred to the Institute by the City for botanic garden purposes. The contractor was Louis J. Sieling, of Manhattan, whose bid was $3,762. The contract time was 45 working days from May 14, and the work was completed on July 15.

Repair of Old Walks.—During September the walks laid by DiMenna & DePaolo in 1914 were reinspected by the landscape architects, and the contractors have made all the repairs indicated. The work has now been finally accepted.

New Fence.—As no unincumbered balances on corporate stock accounts of the City were available for the fencing in of the south addition, as a new appropriation for this purpose by the City was out of the question for 1915, and as the need of the fence was imperative, your Committee, at its meeting of February 3, 1915, authorized its chairman and the director of the Garden to make contracts for the fencing and turnstiles, the cost of the same to be met from private funds to be raised by subscription.

On February 19 an order was placed with the J. L. Mott Iron Works for the construction of the fence, exclusive of turnstiles and gates, for the sum of $1,984.40. The work was completed on June 5. The contract included the removal of the old fence

along the original southern boundary of the Garden, and the repair and resetting of the party-line fence along the west edge of the Brighton Beach R. R. cut, extending from Washington Ave. to Malbone St. This latter part of the work has not yet been done, owing to delays in readjusting the boundary line with the railroad company.

Entrance Gates and Turnstiles.—Since our entire grounds will soon be intensively planted with labeled plants, each one a scientific specimen with accession number, and may of them rare and not easily replaced, and also for other reasons, it is necessary for us to control all entrance and exit to the grounds, as well as to the laboratory building and plant houses. It is also desirable to have an accurate register of attendance, and to accomplish these ends, if possible, without the expense of an attendant at each of the five or six gates. This can be done with an automatically registering entrance turnstile, and exits which would permit persons remaining in the Garden after closing hours to leave without admitting others.

Mr. George M. Beerbower, chief engineer of the New York Zoological Park, became interested in our problem and very kindly consented to devise the turnstiles and exit gates, since nothing suitable could be obtained in the open market. For the turnstiles the difficult problem was a device that would register once, and only once, for each entrance, and would discourage the twirling of the stile by boys. Moreover it was necessary to allow for the passage of baby carriages.

By devices of his own invention Mr. Beerbower succeeded in meeting most of the demands, and a season's experience will demonstrate with what degree of success. Four gates were equipped during the fall and early winter.

The Garden is deeply indebted to Mr. Beerbower for his personal interest and attention, to the end that our needs might be met with entire satisfaction.

Attendance.—The total attendance for the year, including the four months when the conservatories and laboratory building only, but not the grounds, were open to the public, was over 71,600. Omitting the four months just mentioned, the smallest attendance was in August, a month when people are absent from

the City in large numbers, and when the nearby seashore offers superior attraction for hot weather. The largest attendance was in November, which, in 1915, was an unusually beautiful month, with a prolonged season of Indian summer.

Japanese Garden

New Planting.—During the early spring about 170 azaleas and other shrubs were planted in the Japanese garden, bulbs of German and of Japanese Iris were placed near the border of the lake at several places, and thirty or forty honey-locusts and Scotch pines were planted north and west of the garden to serve as a screen between it and the large Museum building. A chrysanthemum bed, surrounded by peonies, was laid out and planted just east of the entrance to the tea-house, and a narrow gravel path was also made along the edge of the lake from the tea-house to the moon-view house. All of this work was done under the personal supervision of the designer of the garden, Mr. T. Shiota.

One of the chief dangers of a Japanese garden in the hands of American gardeners is the temptation to convert it into a flower garden. This results partly from a feeling that a blaze of color is characteristically Japanese, and partly from a failure to understand the purpose and essentials of a Japanese Garden. One or two rather extensive and costly Japanese gardens in America have been practically ruined, from the Japanese point of view, by being transformed into flower gardens, following American ideas. Wisdom dictates that we should keep close to Japanese gardeners in our treatment of the Japanese garden from year to year. So far, many competent critics of Japanese art have assured us that our garden is a close realization of the Japanese ideal, and is, in fact, not surpassed in America for the faithfulness with which it represents this unique form of art.

Formal Opening.—On Friday afternoon, May 7, from 4 until 6, the trustees and their friends enjoyed a preliminary inspection of the Japanese garden. A complete Inari shrine outfit was installed in the temple for the first time on this occasion. A full account of the affair appeared in the RECORD for July, 1915. On Saturday, June 5, the Japanese garden and entire botanic garden grounds (which had been closed to the public for a little over one

year on account of grading and the construction of new walks) were thrown open to inspection by members of the Garden and their friends, and were opened to the general public on the following day.

Preparation of Description and Guide.—During the early summer Mr. Shiota completed a description and guide to the Japanese garden, written in Japanese. After two or three unsatisfactory attempts to secure a good translation of the manuscript into English in this country, arrangements were made through Prof. K. Miyake, professor of botany at the Botanical Institute of the Agricultural College, Tokyo Imperial University, Komaba, to have the translating done in Japan by a Japanese who had previously resided for over ten years in the United States, and who has an American wife. The original manuscript was forwarded to Prof. Miyake on October 29, and the manuscript of the translation is expected by the fore part of February, 1916.

Guarding and Care.—The inadequate municipal appropriation for personal service for the year made it necessary to meet nearly all the expense of care and guard duty in the Japanese garden during 1915 out of private funds.

Photographing Restricted.—After several weeks' experience with unrestricted photographing by visitors, and later with photographing under written permission, your committee passed a regulation restricting all photographing in and of the Japanese garden to the official photographer of the Garden. The rapidly increasing number of amateur photographers, especially on the more crowded Sundays and holidays, the undesirability of having inferior or unauthorized photographs of the Garden offered for sale (as occurred in one instance in violation of the written permit), and the plan of the Botanic Garden to offer for sale official photographs and an illustrated guide, are the chief reasons which led to the very wise action of the committee.

Plans for a Rock Garden

During the late fall the head gardener, Mr. Free, prepared a sketch of the proposed rock garden. Specifications and more accurate plans are being prepared by the engineer of the Park

Department, and it is anticipated that the rockery may be constructed in the early spring of 1916.

Plantations

Work Done.—The report of the curator of plants, appended hereto, gives a detailed statement of the year's work in connection with the plantations. In addition to the regular gardeners we employed an average of about 14 laborers a week from March 19 to November 5. In the busiest periods the force was increased to from 20 to 22 men, and during the last two or three weeks it was reduced to as few as three men, owing to insufficient funds to employ more. Much urgent work had to remain undone owing to the small appropriation for labor, and notwithstanding generous contributions of private funds for this purpose. The needs for 1916 will be as great, if not greater, than in 1915.

In the gardening division proper, the principal events to be mentioned here are the planting of four rows of flowering dogwood trees along the walks of the Museum esplanade, the cooperative experiment with Holland bulbs in conjunction with the United States Department of Agriculture, and the initiation of our seed collecting and first *Seed List,* for exchange with other botanic gardens. Requests were received and filled for 1,150 packets. Seeds received by us in return will be a means of greatly enriching our collections of living plants. Other operations are listed in the report of the curator, pp. 51 to 57.

A careful inventory of plants actually growing has enabled us to bring our office records up to date, and shows that as of December 31, 1915, there were growing in the Garden, in addition to purely ornamental and screen plants, 2,840 species, representing 1,285 genera, besides 544 of doubtful specific identity.

Enlargement of Wild Flower Collections.—Large numbers of native wild flowers, collected on field trips, have been sent to the Garden during the past season by members of the staff. The Garden hopes soon to have under cultivation large groups of each species that grows wild within 100 miles of Brooklyn. Gifts of living plants, in quantity, for this collection will be greatly appreciated.

Recommendation.—The suggestion in the report of the curator of plants, of the desirability of building up our general systematic collection with American plants is worthy of emphasis. As there stated, practically all systematic collections in America, as well as in European botanic gardens, are composed, almost wholly, of plants of the flora of Europe. Many of our native plants are equally beautiful, and interesting, and would serve the purpose as well as those of a foreign flora. If this idea can be followed out and gradually realized, we shall have a unique and unusually interesting collection. The result can be accomplished only by having special collections made for the Garden in the field.

Conservatories

Inadequate Space.—The great congestion in our plant houses as previoustly mentioned, has very seriously hindered the growth of our tender and tropical collections; nevertheless, as much progress has been made as could well be expected under the circumstances.

Snow Guards.—In order to obviate the danger of breakage from snow sliding from the roof of the lantern of the economic house, snow guards of wire mesh were placed on the lower roof, near the base of the lantern in December.

Collection of Boston Fern Varieties.—By cooperative arrangement with Dr. Ralph Curtis Benedict, of Brooklyn, editor of the *American Fern Journal,* the Garden was able to place on exhibition, during October, one of the most extensive collections of the varieties of the Boston fern (*Nephrolepis*), ever assembled in Greater New York. There were nearly seventy named varieties, and invitations were sent, among others, to all the florists of Brooklyn, for a preliminary view from October 8–10. A special *Leaflet* was issued, descriptive of the exhibit.

Popularity of Economic House.—The experience of the past year has emphasized in a striking manner the wisdom of developing the larger of our plant houses as an economic house, for the exhibition of tender and tropical plants having a commercial or economic value. These plants are not only attractive and interesting, but the educational value of such an exhibit is very

great. The exhibit, which was entirely rearranged early in the year, has been specially appreciated by teachers of geography and nature study, who have brought their classes here in large numbers to study the collections. Among plants of special interest that have fruited during the year may be mentioned the banana, lemon, kumquat, citron, lime, grape-fruit, fig, pineapple, loquat, papaw, besides such others as sugar-cane, ginger, sisal, Manila-hemp, tea, coffee, chocolate, Para rubber, camphor, West Indian cedar, Eucalyptus, date-palm, cocoanut palm, papyrus, vanilla, and numerous others.

Australian Cycads.—The arrival on February 16 of a collection of living plants of Australian cycads, collected especially for our Garden, by cooperation with the botanic gardens at Rockhampton, Queensland, was noted in the RECORD for July, 1915. Notwithstanding the fact that, owing to the war conditions, the plants did not reach us until about seven months after they were collected, they have practically all done well under the care of the head gardener. The species represented are *Cycas media, Macrozamia spiralis, Macrozamia Moorei,* and *Bowenia serrulata,* with staminate and carpellate specimens of each. They are not only of much scientific interest and value, but will, in time, make very beautiful specimens. Unless the new wings of the conservatories are completed before next winter, we shall be in danger of losing some of the plants on account of not being able to give them a proper environment.

Library

Growth.—The accompanying report of the librarian records a total of 3,804 books and 5,885 pamphlets; of these 771 books and 2,235 pamphlets were accessioned during the year. Two hundred and twenty-four current periodicals are now regularly received by gift, purchase or exchange. Special attention is called to the valuable gift from the Hoagland Bacteriological Laboratory of 142 volumes of the *Comptes Rendus de l'Academy des Sciences* (Paris), and eight volumes of the *Journal of the Royal Microscopical Society of London.*

The number of readers increases as much as could be expected for a purely reference library, largely technical, and confined to

one branch of science, the total number recorded for the year being 1,027.

Needs.—As soon as the library moves into its permanent quarters, on the completion of our building, its growth and proper care will necessitate the full time of an assistant.

There are still many serious gaps in our files of botanical periodicals. Some of these are expensive or rare and are becoming more expensive and especially more difficult to secure each year. A list of those urgently needed has a total cash value of between $3,500 and $4,000.

Herbarium

Accessions.—The total accessions for the year were 11,936 specimens, of which 3,465 were phanerogamic and 8,471 cryptogamic. Of these 10,583 were received by purchase, 1,315 by collection, and 38 by gift.

Needs. (*a*) *Assistance.*—Out of a total of 135,000 specimens, more or less, about 10,000 are unmounted; until they are mounted they are practically inaccessible as scientific specimens for ready reference. The curator of plants reports about 7,000 sheets mounted this year, not counting the cryptogamic section. It is anticipated that approximately 20,000 or 25,000 specimens will be acquired in 1916. It seems, therefore, self-evident that the proper care of the herbarium, including mounting and other labor, will require, in addition to curatorial work, the entire time of an assistant.

(*b*) *Cases.*—The eight double-faced units of metal herbarium cases, which we now have, accommodate about 100,000 sheets. They are full. In addition we have about 22,500 mounted specimens in temporary wooden cases, and over 10,000 unmounted specimens in storage; in other words, additional metal cases, are needed to accommodate approximately 32,500 specimens in addition to 20,000 or more specimens anticipated in 1916. This will require four double-faced units.

The Staff

Librarian.—Dr. Laura E. Watson Benedict, whose appointment was noted in my preceding annual report, entered upon her duties as librarian on Monday, January 4.

Curator of Plant Breeding.—On December 7, the assistant curatorship of plant breeding was raised to a full curatorship, to begin with January 1, 1916.

Curator of Elementary Instruction.—On December 7, the title of Miss Shaw's position was changed from assistant curator of public instruction to curator of elementary instruction, to take effect January 1, 1916.

Instructor.—The work of elementary instruction, including the children's gardens and teachers' training course, reached such proportions that additional assistance became necessary. The services of Miss Jean A. Cross were secured for Saturday afternoons, from April 17 to June 26, and on July 1 her appointment as instructor on our regular staff became effective. On December 7 the title of her position was changed to assistant curator of elementary instruction, to take effect on January 1, 1916. The academic record and professional experience of Miss Cross is given in the appended report of the curator of public instruction.

Laboratory Assistant.—On September 1, Mr. Frank Stoll was appointed laboratory assistant in place of Mr. Guy S. Bisby, who resigned on May 3.

Assistant Secretary.—Early in the year it became evident that an assistant secretary of the Garden was absolutely necessary. As no municipal appropriation had been requested for this position in the budget for 1915 your Committee authorized the expenditure of private funds for this salary.

Department of Public Instruction

Cooperation with Schools.—The appended report of the curator of public instruction records 60 talks and lectures given at public and private schools during the year, with a total of 16,000 auditors. Early in March posters were sent to all local schools, giving a list of 18 talks to be given at the Garden on various topics related to plant life, and closely correlated with the geography and nature study work of the schools, and a similar poster, listing 17 talks, was distributed early in October. Largely in response to this offer, two hundred and sixteen classes with their teachers, comprising about 25,000 children, visited the Garden for regular or special lectures, or demonstrations; this is an average of nearly

22 classes a month for the ten months of the school year. Children's home gardens, to the number of 312, were visited and supervised.

Requests from high schools for study and loan material, including Petrie dishes with sterilized nutrient media, were about double the number of those received in 1914.

Attendance.—The total attendance of visiting classes from local schools was over 6,600, while the attendance at our own classes, in regular courses of instruction, was over 9,100.

Course for Teachers.—The course for the preparation of teachers of children's gardens was enriched by the addition of new sub-courses, and the registration, totaling 40 for the year, was nearly six times as large as in 1914, but only four persons completed the course in time to receive certificates on December 11.

Annual Children's Garden Exhibit.—A full report of the second annual children's garden exhibit may be found in the Garden Record for October, 1915. About four times as many children exhibited as at the first exhibit, the number reaching nearly 2,000.

Penny Packets of Seeds.—Over 85,600 penny packets of seeds were distributed to school children during April. This is an increase of more than 60,000 over the number distributed in 1914, when the work was initiated.

Organization of Graduates.—The organization, by our graduates, of the Garden Teachers' Association of the Brooklyn Botanic Garden has already been mentioned as a news item in the Record. This is an evidence, not only of appreciation of our work, but of enthusiastic loyalty to the Garden. Such an organization may, in time, become a very potent influence in the affairs of any educational institution.

Success of Our Graduates in Civil Service.—It speaks well for the high character and thoroughness of our course for the preparation of teachers of children's gardens (as well as for the individual herself) that one of the graduates of our first class, Miss Maude Snedecker, stood first in the civil service examination on August 5, for school-farm attendant in Greater New York, receiving 96 credits out of a possible 100. Another of our

graduates stood second on the written examination, but had not had sufficient experience to rank second, on the final list.

Needs.—The needs of a larger area for the children's garden, of a children's building on the site of their garden, of a lecture hall, and additional class-room and laboratory space will all be met by the new land acquired this year, and by the anticipated completion of our laboratory building and a children's building next year.

Our greenhouse classes for children are, however, increasing to a point quite beyond the capacity of the greenhouse now available for that purpose, and undoubtedly the Garden will shortly be obliged to consider the construction of a greenhouse wing for the special accommodation of classes of both children and adults.

Investigations

Local Flora Studies.—On January 30 was published the *Flora of the Vicinity of New York: A Contribution to Plant Geography,* by the curator of plants, Mr. Taylor. This work, of 683 pages, was published as *Memoirs of the New York Botanical Garden, Volume V.* Its publication by the New York Garden was owing to the fact that the work was initiated while the author was on the staff of that institution, from 1909–1911, and was prosecuted with the active cooperation of the director, Dr. N. L. Britton, who freely placed all the facilities of that garden at the disposal of Mr. Taylor. The book deals chiefly with the distribution of the flora near Greater New York. It is more than a local flora, since it is written from the phytogeographical point of view, and is a contribution to the attempt to explain the origin and present distribution of our local flora.

Mr. Taylor has also continued his studies during the year, making numerous field trips for collection, and for a more intensive study of the flora of Long Island. As an illustration of the extent to which our knowledge of the flora of Long Island is being extended by these studies, two maps are here given, one showing the known distribution of the swamp honeysuckle (*Rhododendron viscosum*) at the time our own explorations began (January, 1914) and the other the known stations for the same plant at the close of 1915 (fig. 3).

FIG. 3. Botanical survey of Long Island. A, showing distribution of swamp honeysuckle or azalea (*Rhododendron viscosum*), as illustrated by herbarium specimens, 1914. B, the same in December, 1915. Similar maps have been made for all the native plants of Long Island.

Numerous collecting trips by various members of the staff have also served to enrich our herbarium and the local flora section of our plantations.

Plant Breeding.—Investigations of heredity, variation and environment in peas, castor beans and corn have been carried on during the year by Dr. White, resulting in throwing more light on the laws governing the heredity of characters in these plants, and by extension, on the laws of heredity in general. The chief studies are being made in collaboration with the Bureau of Plant Industry of the U. S. Department of Agriculture with peas, and through help obtained from the Department, and from other sources, over two hundred and fifty varieties from all parts of the world have been collected and grown in the plant-breeding plots of the Garden. Hundreds of crosses between these varieties have been made, and through this means, it is hoped eventually to make known the manner of inheritance of all the characters which distinguish the numerous varieties and species of the genus *Pisum.* The relation of some of these characters to different environments is also being studied. It is needless to say that such studies ultimately have a direct practical bearing on agricultural and horticultural practice. At present the work is much hampered through lack of sufficient greenhouse space for growing winter cultures, and no considerable extension of the summer work will be possible unless additional space can be secured for out of door cultures.

In September, Miss Stella G. Streeter, teacher of biology in the Jersey City high school, registered for graduate study, and is investigating, under Dr. White's direction, the inheritance of seed-coat color and its relation to other characters in peas.

In addition to the above mentioned studies of the assistant curator of plant breeding, Dr. Ralph Curtis Benedict has prosecuted at the Garden his investigations of the varieties of the Boston fern (*Nephrolepis*). Preliminary results of this work were embodied in a paper on *Orthogenetic saltation in Nephrolepis,* read by Dr. Benedict before the Botanical Society of America on December 29, at Columbus, Ohio.

During November the director sent to the editors of numerous horticultural journals a list of the varieties of *Nephrolepis* then

growing at the Garden, together with a brief statement offering cooperation with American growers of that fern. This circular stated the purpose of the Garden, not only to make a scientific study of the genus, but to conduct the investigation in a way to make it of value to American growers. An offer was made to exchange cuttings of our plants for those we did not have, and to answer any requests for information. Arrangements were also made to reprint and distribute to those interested, Dr. Benedict's article on *Nephrolepis,* prepared for the Standard Cyclopedia of American Horticulture. The results of this work will not be fully realized until 1916, but already responses have begun to come in, and our collections will ultimately be thereby greatly enriched.

Establishment of Research Fellowship.—At its meeting of November 9, your Committee voted to establish the first research fellowship of the Garden. The purpose of this fellowship is to make possible a much needed survey of the diseases of the trees and shrubs of Prospect Park, with a view to a better understanding of the nature and causes of such diseases, and methods of prophylaxis and treatment. The expense of this fellowship is to be met from private funds, and the Commissioner of Parks has given his hearty approval and offer of cooperation.

On November 24, Dr. W. H. Rankin, assistant professor in the New York State College of Agriculture, at Cornell University, was appointed to this fellowship. Professor Rankin plans to be in residence at the Garden during three summer months in 1916 and 1917.

The information obtained as a result of this survey will be placed freely at the disposal of the Department of Parks, and should yield results that will make it possible for the Garden to suggest remedial measures of much practical value.

The establishment of this research fellowship should be regarded as establishing a permanent policy at the Garden, and it is sincerely hoped that, as soon as may be, after the completion of our building insures adequate accommodations, funds may become available for the establishment (preferably by permanent endowment) of a number of such fellowships.

In June, Prof. H. M. Fitzpatrick, of the department of plant

FIG. 2. Children's garden exhibit, 1915. Public School No. 129 bringing its exhibit.

pathology of the New York State College of Agriculture at Cornell University, joined the Garden staff for three months for the purpose of continuing his studies of various fungi and fungous diseases of plants.

Publications

Record.—Volume IV of the RECORD contained 137 pages and 17 halftone illustrations.

Leaflets.—Series III comprised twelve numbers, which appeared at weekly or bi-weekly intervals. The popularity of this publication continues to increase, requests for it being received from all sections of the country. Additional requests speedily exhausted the issue of several numbers.

Contributions.—One number of the *Contributions* appeared, and two other numbers are now in the printer's hands.

American Journal of Botany.—The second volume of the *Journal* comprised 581 pages. This volume was printed on the Clarke memoir paper, which is an uncoated, linen rag paper, and thus insures as great a degree of permanency as may be had with any modern paper. The adoption of this paper makes the *Journal* doubly valuable as a medium for publication on account of the element of permanency. Cheaper papers, especially coated papers of wood pulp stock, have a life of only a few decades. Their progressive deterioration will ultimately result in the loss of all records printed on them. The publication of the *Journal* has enriched our library through exchange courtesies, to the number of fifty publications.

The Garden could not have rendered a more needed service to botanical science than to make possible the establishment of this *Journal.* The results of botanical investigation are accumulating so rapidly that the present facilities for publication are wholly inadequate. Prior to January 1, the *Journal* had in hand contributions sufficient to fill an entire volume as large as the one published last year. Other botanical magazines are even more congested, so that an investigator can usually not secure the publication of the results of his investigations until a year or eighteen months after the manuscript is completed.

It is hoped that the size of the *Journal of Botany* can be some-

what enlarged this year without incurring any deficit, or at least only a very moderate one.

Prospectus of Courses.—The *Prospectus of Courses* and other educational and scientific opportunities offered at the Garden for 1916, was issued in December as a separate reprint from the Botanic Garden RECORD for January, 1916. In this announcement the courses are classified in four groups, as follows.

A. Children's gardens and nature study. This includes courses and lectures for children, and courses for teachers, including 9 courses and 5 lectures.

B I. Courses for teachers of children's gardening (10).

B II. Summer School of children's gardening (Repetition of Courses *B 1*—*B 10*).

C. Courses for the general public (9).

D. Advanced courses and investigation (9).

The total number of courses scheduled for 1916, exclusive of lectures and docentry service, is 37, an increase of eight over 1915.

Miscellaneous.—In May an illustrated pamphlet, of 20 pages and cover, was issued in connection with our membership canvass, and in July a second edition was printed of the little booklet of information about our organization and activities.

Garden Membership

Reorganization of the Institute.—An outline of the reorganization, in January, of the Brooklyn Institute, especially as it affects the Garden, was given in the RECORD for July. As there noted, the new constitution, adopted on January 14, provided for several classes of membership including benefactors, patrons, donors, permanent members, life members, sustaining members, and annual members.

Members Enrolled.—The Garden's canvass for members, inaugurated in April by the mailing of invitations, resulted in the enrollment of three life members, ten sustaining members, and sixty-seven annual members, in addition to thirteen sustaining memberships taken out through other Departments, and entitled thereby to full privileges of Garden members.

Financial Matters

Municipal Appropriation for Maintenance.—The City appropriation for maintenance was $37,124.50, a decrease of $511.67 from the appropriation for 1914, notwithstanding the fact that the cost of maintenance during 1914 was $4,181.18 in excess of the City appropriation for that year. The amount required for maintenance in 1915 was $40,174.76, the excess of expenditure over City appropriation ($3,049.76) being contributed, as in 1914, from private funds. Of this excess, $2,245.35 was for day laborers on the grounds, and $447.22 for part time of an assistant secretary of the Garden.

Corporate Stock Balances.—Unincumbered balances remaining on previous appropriations of corporate stock (exclusive of building appropriation), and totaling $6,054.65, were applied to the grading, drainage, and construction of new walks on our south addition and elsewhere. As in the case of maintenance, City appropriations were inadequate to meet the needs of the Garden, and private funds were contributed to the amount of $3,489.56, including two thirds of the commission of the landscape architects in connection with the new walks.

New Issue of Corporate Stock.—The circumstances leading to the authorization of a new issue of corporate stock of the City of New York, to an amount not to exceed $100,000, are recorded earlier in this report (pp. 26–29), and a copy of the resolution of the Board of Estimate and Apportionment is appended hereto as Appendix 6.

Private Funds.—In addition to the contribution of $100,000 previously noted (p. 28), and not including the Japanese Garden, the total amount expended for Garden purposes from private funds during the year was $15,309.06, exceeding by $3,792.21 the amount for 1914, and being the largest annual total of such funds since the establishment of the Garden. In addition to $2,692.57, required to meet the deficit in salaries and wages, $2,508.93 was expended for the erection of an iron fence to enclose the newly acquired south addition, and in the construction of entrance turnstiles and exit gates at four of our entrances, all of which items should properly be met by the City, and were absolutely necessary in order properly to protect City property.

Needs of the Garden

Increased Municipal Appropriation for Maintenance.—The preceding paragraph, and an analysis of the appended financial statement, clearly indicate that the annual City appropriations for maintenance are not adequate to meet the needs of the Garden. They are not even sufficient to secure proper upkeep of the property and care of the grounds, not to mention the requirements of reasonable increases in salaries and a normal, healthy expansion of our work. The need will be still further increased in 1916 by the fact of our having a larger area, and a much greater percentage of it in lawn, laid out in beds, and planted with trees and shrubs which require cultivation.

Increased Endowment.—From the appended financial statement of private funds accounts, it will be seen that the expenditures from all accounts, omitting the Japanese Garden, give a total of $15,308.46. The total expenditure for 1915 is nearly equivalent to the income, at 4 per cent. on $400,000. Our present endowment is $125,500. Proper regard for the expansion of our educational work commensurate with the growing demands and the present need for it, and for the development of our scientific work commensurate with its importance, makes it self-evident that the Garden should as soon as possible have an endowment fund sufficient to insure an annual income of at least $25,000, the interest at 5 per cent. on a principal of $500,000.

Nursery and Experimental Plot.—In the plans which have been adopted for the development of our present property, provision is made for only a small plot for nursery and experimental purposes. The present requirements of our plantations have made this necessary; but it is only a question of a very few years before we shall have to have a larger nursery and experimental plot, or else curtail our public exhibits and our scientific work. The comparatively small size of the Garden, and its location between four much travelled thoroughfares, render it extremely difficult to locate a service yard of adequate size and properly screened from public view.

Sabbatical Year and Service Pensions.—Attention may again be called to two needs which should be provided for as soon as

possible, namely, a sabbatical year for members of staff of curatorial rank, and service pensions for all employees. These matters were noted more at length in my preceding report. Provision is made for both of these features in all of our leading universities, and in a number of our museums and other scientific institutions.

Woman's Auxiliary.—There are innumerable ways in which a woman's auxiliary could be of great help in furthering the development of the Garden, especially in its articulation with the local public. Now that our membership is growing, and our buildings are on their way to completion the organization of such an auxiliary should not be longer delayed.

Acknowledgments

Grateful acknowledgment is hereby made to Mr. Lester L. Ditmas, Brooklyn, for 15 photographs; to Mr. G. H. Schenk, Brooklyn, for 6 photographs; to Mrs. J. F. Nolan, Brooklyn, for 5 fancy gold fish for the conservatory pool; to the donors of publications to the library, as listed in the report of the librarian (p. 79); to the donors of living plants, listed in the report of the curator of plants (p. 55); to the Commissioner of Parks, the Hon. Raymond V. Ingersoll, for 66 trees of Norway maple set out along the street adjacent to the south addition of the Garden, on Washington and Flatbush Avenues and Malbone St., and for a generous supply of leaves for leaf soil, and to the following subscribers to the Botanic Garden Collections Fund, 1915.

Frank Bailey
George V. Brower
S. Seeley Brown
Dr. H. B. Delatour
H. F. Gunnison
A. Augustus Healy
Frances Ingraham
Martin Joost
William J. Kelley
John McCallum
Adolph Müller
Henry F. Noyes
George D. Pratt
William A. Putnam
Clifford S. Trotter
Miss Florence Starr
Herman Stutzer
Mrs. John Van Nostrand
Mrs. Frederick Willenbrock
Col. Robert B. Woodward.

Accompanying Papers

The following papers and documents are appended as a part of this report:

1. Annual report of the curator of plants.
2. Annual report of the curator of public instruction.
3. Annual report of the librarian.
4. Financial statements covering municipal appropriations and private funds.
5. Appendices I–II.

Respectfully submitted,

C. Stuart Gager,
Director of the Garden.

REPORT OF THE CURATOR OF PLANTS FOR 1915

Dr. C. Stuart Gager, Director.

Sir: I take pleasure in submitting my report as curator of plants for the year ending December 31, 1915.

General Maintenance and Construction Force

Work started on March 17, the same date as for the preceding two years, and was stopped for lack of funds, on November 5, nine days earlier than last year. The men could have been kept busy to advantage throughout the remainder of the year. During 12 of the busiest weeks we employed 20–22 men, for 10 weeks, 11–18 men, and for 12 weeks 3–9 men. Actual maintenance work, as in previous years, has suffered because of new construction work, and with the largely increased area of lawns, put down this year, the maintenance problem will be acute during 1916 unless we can add to the force for that purpose. Deducting one or two men for guard duty near the Japanese garden and other miscellaneous work, leaves this force rather short-handed.

New work done during the year includes the following: Making gateway and roadway near the Eastern Parkway entrance; grading on new addition along Flatbush Avenue, for site of fence, afterwards erected by the J. L. Mott Iron Works; a good deal of cleaning up and path surfacing in and near the Japanese gar-

FIG. 4. The Japanese garden, showing the island and cave, drum bridge, bronze storks, stone lantern (*Yukimi*), and moon-view house (*Tsukimido*).

den; grading and seeding down lawn on the hill southwest of the large conservatory; grading and seeding down lawn on a triangular section near Section II; making and sodding about 10,000 sq. ft. of terraces along the edges and near the southerly end of the esplanade and at the reservoir gate; grading and seeding down the esplanade and several adjacent areas; clearing rubbish from new (south) addition; grading site of experimental garden and new site for children's gardens; and plowing, harrowing and planting of winter rye on same.

A very considerable area has been put down to permanent lawn, following, with some changes, the scheme for soil improvement outlined in my first annual report. Much of this work could not have been done without liberal use of top soil for surface grading, and during the year we have received about 2,400 cubic yards of this material. Of this, 1,720 cubic yards were purchased, and it is a pleasure to report that 680 cubic yards were presented through the generosity of Mr. J. J. Hillin and of the Norton and Gorman Company.

A considerable amount of work has been done by both men and horses for the gardeners and for the children's gardens. As before this force has been under the immediate supervision of Mr. Herman Kolsh, the regular foreman.

Gardening Force

The work in this department has been under the supervision of the head gardener, Mr. Montague Free. The force and its duties were the same as in 1914. Besides regular maintenance, which has increased very materially, owing to the growth of the collections the gardeners completed new work as follows:

1. Planting 156 specimen trees of flowering dogwood (*Cornus florida*) on the esplanade.
2. Economic House plants reset, and arranged in groups according to economic use such as foods, fibers, drugs, etc., many of them being planted out permanently.
3. Planting of conifers around the lake, both for additions to the Pinetum and as screen for the Japanese garden. Some deciduous trees were also planted for the latter purpose.

4. Six thousand bulbs consisting of 30 varieties of tulips and 8 of narcissus were planted in 36 beds. Half of these bulbs were secured in Holland, the balance came from the U. S. Department of Agriculture. This is in the nature of an experimental planting, in cooperation with the Department, the object being to compare American grown and Holland bulbs of the same sorts under uniform conditions.
5. Local Flora beds replanted and rearranged, so that the classification would be more systematic, and local overcrowding corrected.
6. Ornamental planting along the brook, where large groups of water-loving species have been planted.
7. Remaking of the chrysanthemum and peony bed near the Japanese garden.

During the year seeds of about 800 species and varieties were collected for the seed exchange system, and 1,150 packets were distributed in response to requests resulting from the publication of our first annual *Seed List*.

As before, a good deal of time has been given to the department of public instruction and to the experimental plantings, and Mr. Free has given many talks and practical demonstrations on gardening.

During the coming year nearly all the systematic collections will have to be moved so as to occupy that part of the south addition shown on the new plan for those collections, which was approved by you on December 22. This plan has involved a re-study of the whole arrangement of the systematic collections by Mr. Caparn and myself, and the scheme as finally laid down will make the different orders much more homogeneous units and leave larger grass spaces between each order. An account of this scheme appeared in *Landscape Architecture* for July, but the area now occupied by the collections is larger than on the plan shown there.

Labeling and Other Clerical Work

During the year, 447 labels have been made for herbaceous collections, about 150 of a temporary nature, for the greenhouse,

212 for woody plants out of doors, and 123 signs and special labels, usually for special purposes. The labels and signs have all been made at the Garden, and it will be desirable to continue this arrangement, which should occupy practically all of one man's time, as our collections grow.

The plant accessions during the year and to date are as follows:

By purchase	227
By exchange	113
By gift	79
By collection	246
By seed	403
Total	1,068

Accession numbers 5418–6271 inclusive were assigned during the year. In the autumn a census of all the plants cultivated in the general systematic garden, the local flora, pinetum, conservatories, nurseries and along the brook was taken, in order to check up our actual condition with the records in the office, and to correct such errors as might be found. A count of these corrected records shows, as of December 31, 1915, that we have growing 2,840 species in 1,232 genera, besides 544 that are as yet of doubtful specific identity, making a total of 3,384. The difference between these figures and those in my report of last year is due to the fact that the latter were based on office records merely and did not show our actual condition as the present figures do.

Following is a list of the donors of living plants (including packets of seeds); the figures indicate the number of specimens donated.

Plant Gifts, 1915

Dr. Ralph C. Benedict, 13; Miss Ida Heaton, 2; Miss Maude H. Purdy, 2; Mr. E. J. Winslow, 1; Mr. A. T. White, 1; Miss E. M. Kittredge, 2; Mr. C. A. Weatherby, 1; Mr. J. McCallum, 5; Mr. F. H. Ames, 2; Miss F. A. Mulford, 1; Dr. E. B. Brainerd, 2; Mrs. C. S. Phelps, 1; Mrs. J. D. Prince, 1; Mr. John N. Drake, 2; Mr. William Andrews, 1; Mr. D. Steengrafe, 1; Mr. John L. Childs, 1.

Phanerogamic Herbarium

The work in this department consisted chiefly in rearranging the collection after the new cases arrived, and in the mounting of specimens already on hand. About 7,000 sheets were mounted during the year and most of these have been sorted, provisionally, into their proper places. The amount of purely technical work still to be done on the herbarium, to make it of botanical significance, as such collections go, is very considerable. There is also a great need for specimens from tropical regions in order to facilitate the naming of the greenhouse collections. Because of the already crowded conditions, in spite of the fact that we doubled our herbarium cases during the year, few additions have been made. Among the more important are collections from the Philippine Islands (304), collections by A. A. Heller from the Pacific coast (500) and collections of John McCallum, mostly local (1,700). The total accessions were 3,465.

During the year Dr. Alfred L. Gundersen has attended to many of the details of this department, and he has had assistance from time to time in the cataloging and herbarium work.

Special Needs

On the grounds, it will be necessary to resurface all our bituminous walks with sand during the coming year. Also the fence along the boundaries is in need of a good deal of repair work and considerable painting. Some of this would have to be done by outside help. Very early in the spring we should extend the water pipes for irrigation purposes to the south addition, so that development and planting will not be delayed.

For the collections, now that permanent planting plans are outlined, we should put in all the trees and plants of a permanent nature we can during the coming year. The planting of such collections has been so long delayed that we should push this side of our work to the utmost now that permanent plans are ready to be worked out.

For the systematic collections, I would urge that the Garden try to accumulate the greatest possible collection of American species that can be had. The desirability of doing this in such

an institution as ours, is patent, for there are few gardens that make any special feature of this. Collections of living plants in this country are largely dominated by trade lists and by the seeds offered in exchange by European botanical gardens. If we could build up in the next few years a collection of representative American species it would not only prove instructive to the public, but prove a valuable exchange asset to the Garden. The building up of such a collection requires a great deal of exploration work, and a number of interested correspondents in different parts of the country. I would suggest that the Garden during the next few years inaugurate several such exploration trips.

I have already received several invitations to go on such expeditions, where a competent botanist, familiar with his local region, was willing to act as guide.

Personal Activities

In January my book on the Flora of the Vicinity of New York was published. I have continued the botanical exploration of Long Island, but there is still much to be done before a comprehensive survey of the island is completed. The editing of *Torreya,* and the answering of many inquiries for the determination of specimens, running from one to several hundred in a single inquiry, have occupied considerable time.

Other activities are the same as outlined in my last report, except that I no longer serve on the executive committee of the Department of Botany of the Institute.

Respectfully submitted,

NORMAN TAYLOR,
Curator of Plants.

REPORT OF THE CURATOR OF PUBLIC INSTRUCTION FOR 1915

DR. C. STUART GAGER, DIRECTOR.

Sir: I have the honor to submit herewith my report as curator of public instruction for the year ending December 31, 1915.

Courses of Instruction

Of the twenty-nine courses of instruction offered in 1915, twenty-one were given during the year, with a total registration of 1,023, and a total attendance of over 9,100.

During the spring the work of elementary instruction, especially in connection with children's gardens, assumed such proportions that additional assistance became imperative. The services of Miss Jean A. Cross, of the Teachers' Training School, at Yonkers, were engaged for Saturdays from April to June, inclusive, and on July 1, Miss Cross joined the Garden staff as instructor. In December the title of her position was changed to that of assistant curator of elementary instruction to begin with January 1, 1916.

Miss Cross is a member of the class of 1909, of Wellesley College; taught in a private school in Arlington, Mass., from 1909 to 1910; was field assistant in the Fairview Garden School, Yonkers, N. Y., from 1910–1911; and was garden director for the Boston Social Union for 1911 and 1912; teacher of nature study at Yonkers Training School for Teachers 1912–13; traveled and studied in Europe 1913–14; teacher of nature study again at Yonkers Training School from 1914–15.

A summary of the work in children's gardening, written by Miss Shaw, is incorporated in this report.

One phase of this teaching which is not there described is that with Boy Scouts, Camp Fire Girls, and similar organizations. Instruction was begun in October in various phases of nature study, forestry, gardening, and agriculture, of such a nature as to be especially adapted to the needs of Boy Scouts and Camp Fire Girls. Although the offer of instruction was not extended to these organizations till late in the fall, there were altogether 83 who took advantage of it. Both the Garden and the adjacent Prospect Park present splendid opportunities for the study of trees and other outdoor nature study subjects. When the superior advantages offered by the Garden in these lines becomes somewhat better known, there is no doubt but that our facilities for such teaching will be taxed to the utmost. In order to have the greatest measure of success, such teaching must be done by

one in thorough sympathy with the work. The Garden is fortunate to have secured the services of one so well trained and possessing such an appreciative viewpoint. Mr. Frank Stoll has had more than two years' experience as scoutmaster in Dover, N. J., and in Brooklyn, and his broad interest and appreciation of the aims of scoutcraft are shown by the fact that he is an expert examiner in agriculture, gardening, forestry, conservation, bird-study, carpentry, and bee-keeping. His teaching experience in the public schools of New Jersey covered ten years; one year was spent in the Dover business college, and one in teaching ungraded classes in Brooklyn. He resigned from the latter work to come to the Garden in September.

The increasing popularity of the group of courses for teachers of children's gardening is attested by the fact that a total of nearly 40 young women were taking this work during the fall; while a total of 94 were registered in that group of courses which are primarily intended for the general public.

As in previous years, the advanced and research courses have been to a large extent held in abeyance, pending the time when the completion of our building will provide adequate room and facilities for teaching and botanical investigation.

Cooperation with Local Schools

Talks at Schools.—About 60 talks and lectures have been given during the year, at both public and private schools, reaching over 16,000 pupils.

School Classes at the Garden.—The Garden has exercised a most potent influence during the past year, especially on the elementary schools of Brooklyn, as is evidenced by the fact that 216 classes with their teachers came to the Garden for lantern talks or trips through the conservatories. This important part of the Garden activities is fully explained in the appended report of the assistant curator of public instruction.

Several of the high schools and colleges, as well as private schools, also took advantage of their opportunities to visit and to study the work of the Garden. In several instances we arranged for demonstrations on various phases of plant activity. To many

of these classes special talks were given, and all were conducted through the conservatories and plantations of the Garden. Some of the schools which utilized our facilities in various ways are Erasmus Hall, Girls' High, Boys' High, Manual Training, Commercial, Eastern District and Bay Ridge High Schools, Ethical Culture School (Manhattan), Berkeley Institute, the Brooklyn Training School, and Teachers College of Columbia University. Also a class of 35 seniors from Pratt Institute, specializing in kindergarten work, came to the Garden at regular intervals from February to June, for practical instruction in gardening methods.

Assistance in Home Gardening.—As this work is adequately explained in the report of the assistant curator, I need only add the fact that during July and August, the instructor, Miss Cross, visited 312 home gardens throughout Brooklyn; and that, particularly in the outlying districts, this method of actual visit to the homes has provided much sympathetic encouragement in home gardening.

I might here again call attention to the wisdom of centering at the Garden all the work throughout the Borough in the teaching of gardening and in the stimulation of home garden work. Such a plan would certainly make for greater economy as well as greater efficiency.

Study and Loan Material.—As heretofore, the majority of requests for study and loan material have come from biology teachers in various high schools throughout the City, for Petri dishes filled with nutrient agar, designed for the study of bacteria and molds. This year, requests for nearly 500 Petri dishes have been filled, twice the number of the preceding year. When our facilities for making such preparations are increased, as planned in the completed building, and when teachers become more familiar with our offer to furnish such material, we anticipate many more such requests.

Editorial Work

During the year a portion of my time has been occupied in editing the *Leaflets,* and in editorial work on the *American Journal of Botany.*

Of the *Leaflets,* only twelve numbers of Series III were issued, instead of the usual fourteen, but two of the numbers were double and illustrated. Our present mailing list is fast approaching 1,000, many of the calls being from libraries and individuals from a distance. The purpose of the *Leaflets,* as stated in an early number, is two-fold: to furnish notice from time to time concerning exhibits or concerning plants of special interest to be seen at the Garden near the date of issue, and also to present to teachers and others brief, popular summaries of certain subjects of botanical interest.

The assistant curator of public instruction, Miss Shaw, has also continued to serve as editor of the *National Plant, Flower and Fruit Guild Magazine,* and as editor of the Children's Department of the *Garden Magazine,* and of The Nature Club of *Country-Life-in-America.*

Cryptogamic Herbarium

The following accessions of mosses, algae, and fungi were made during 1915:

Mosses, by purchase	48
Mosses, by gift from Mrs. N. L. Britton	1
Algae, by purchase	50
Fungi, by purchase	8,285
Fungi, by collection	50
Fungi, by gift from Mr. F. H. Ames	37
Total	8,471

The report of the assistant curator of public instruction follows.

Report on Elementary Instruction

By Ellen Eddy Shaw

The work in elementary instruction has continued along three lines, which at the very beginning of the work seemed to be most imperative, viz., children's class work, cooperation with schools, and instruction for teachers. It is the purpose of this report to make a statement of the growth in these three lines of activities, and to point out the natural expansion from the set lines.

FIG. 5. Children's garden exhibit, 1915. Exhibit of Public School No. 150, which took first prize.

Children's Classes.—The registration in the children's classes at the Garden always will be comparatively small. These classes include those of spring and fall greenhouse work, six classes covering six weeks each, and the outdoor garden courses continuing over a period of six months. During the year of 1915 the registration figure for this work was 475. One might immediately question this figure and ask why we do not cut down the length of the long summer course and so double our figures. The answer is briefly this: that we are working educationally and not numerically. That is, the Botanic Garden is training up a body of boys and girls whose knowledge is somewhat comprehensive and who, at the same time, are growing into the life and understanding of the institution. This figure may be doubled and quadrupled when the present capacity of the building and greenhouses is increased.

It might be well to state here that some of these boys and girls who came into the first classes are working with us on special botanical topics independent of class periods. These are students now in our local High Schools. What it may mean in the future to the city of Brooklyn, and to this special institution, to have a large number of young citizens intelligent and loyal to its civic work is worth consideration. The class work at the Garden is planned purposely to react on the home and school. Children in many of our outdoor gardens last summer entirely supplied their home tables with fresh vegetables during the season; home gardens have been planted from seedlings raised in the spring greenhouse classes; various school gardens have received hundreds of young plants; homes have had blossoming plants—gifts from young sons and daughters; one boy's father moved from a congested neighborhood in Brooklyn to the country so that his son might have larger opportunities for work. As a direct result of our work, more than one family removal has come about so that a child might have a yard; and one lad had a present of an acre of land because of good class work in the Garden greenhouse.

Cooperation with Schools.—And yet the other side of the question is imperative too, that of reaching out and teaching large numbers of boys and girls. We have tried to meet this demand in two ways: first, by offering to give special short courses to a

school making up its own classes; second, by special lectures for entire classes.

The first solution of the problem never can wholly solve it; for it too must be limited by the capacity of our building and our staff for instruction. It might be well to note here that schools so far removed as P. S. 36 and P. S. 148, requiring a trolley ride of three quarters of an hour to reach the Garden, feel that it is essential to have classes at the Garden, the children paying their own car fares for six consecutive weeks and never missing a lesson. No one is allowed to remain in a Garden class who does not represent his school in the best possible way. It also might be of interest to state here that P. S. 89, a Gary school, avails itself of this opportunity for class work. At the present time we have a waiting list for classes desiring work and made up by the school principal. These classes are not the Friday and Saturday classes scheduled in the Prospectus as our regular ones, but are quite separate and put in at the special request of schools.

School lectures at the Garden developed not only from an actual and imperative need for handling larger numbers, but also because a Botanic Garden, supported in part by municipal appropriations, ought to assist in the nature study teaching of the city schools. Therefore, talks on certain subjects prescribed in the city course of study were offered because we had lantern slides and living plant material to illustrate such subjects, and greenhouse and laboratory facilities to illustrate simple ways of doing things in class-rooms. Two sets of these talks have been offered to the schools, one in the spring, the other in the fall. The subjects are as follows:

TALKS GIVEN TO SCHOOL CLASSES AT THE BOTANIC GARDEN

April to June

GRADES 3A AND 3B

1. Common wild flowers in bloom. (Wild Flower Garden, May–June only.)
2. Common trees. (Field trip, in the Botanic Garden.)
3. Seeds and seedlings. (Experiments.)
4. Methods of propagating plants. (Greenhouse.)
5. Formation of soil. (Demonstrations.)

GRADES 4A AND 4B

6. Cultivation of plants by slips, seeds, etc. (Greenhouse.)
7. The cultivation of rice in Japan and China. (Lantern slides.)
8. Some useful plants of subtropical climates. (Lantern slides and living plants.)

GRADES 5A AND 5B

9. Plants useful to man. (Lantern slides and living plants.)
10. Trees: blossom and fruit formation. (Botanic Garden grounds, May–June only.)
11. Common shade trees. (Botanic Garden grounds, May–June.)
12. Evergreens and deciduous trees. (Botanic Garden grounds, May–June.)
13. Food plants raised in the United States. (Lantern slides.)
14. Plant industries and products of the United States. (Lantern slides.)
15. Cotton raising in the South. (Lantern slides.)

GRADES 6A AND 6B

16. Coffee culture in South America. (Lantern slides and living plants.)
17. The rubber industry in South America. (Lantern slides and living plants.)

GRADES 7A AND 7B

18. Agricultural products of the United States. (Lantern slides.)
19. Some agricultural products of the Orient. (Lantern slides.)

October 20 to December 15

GRADES 4A AND 4B

1. Cultivation of plants by seeds, slips, runners, etc. (Greenhouse.)
2. What plants need for growth. (Experiments.)
3. Plant variations in the hot, cold and temperate countries. (Lantern slides and specimen plants.)
4. The cultivation of rice in China and Japan. (Lantern slides.)
5. How boys and girls can help make Brooklyn a more beautiful city. (Lantern slides.)

GRADES 5A AND 5B

6. How to plant bulbs for winter bloom. (Demonstration.)
7. Plant foods raised in the United States. (Lantern slides.)
8. How nature disperses her seed. (Demonstration.)
9. Useful plant products. (Lantern slides.)
10. How to distinguish common evergreens. (Study of the trees themselves.)

GRADES 6A AND 6B

11. The classroom window box. (Demonstration.)
12. Coffee culture in South America. (Lantern slides.)
13. How rubber is obtained. (Lantern slides.)

GRADES 7A AND 7B

14. Plants for classrooms and care of same. (Demonstration.)
15. Agricultural products of the United States. (Lantern slides.)
16. What plants mean to the world's commerce. (Lantern slides.)
17. The life story of a tree. (Demonstration and slides.)

Over 6,000 children came to these talks in 1915. They came in classes with their teachers during school hours. Usually this represents to them their spring or fall excursion: they came first to the Garden for their lesson; went through the greenhouse to see the economic plants familiar to them in the pages of their geographies, but not known face to face as living, real plants, and finally took a short trip through the Japanese Garden, returning thence to school or to Prospect Park for a little play, a lovely ending for the one precious day set apart for excursioning.

As before, our cooperation with the public schools did not end with the talks at the Garden, but whenever the call came, especially in the spring time, for talks at public schools, we went. These talks were on the general subject of garden making. The request came because principals felt that the children should hear a few simple directions on how to start their home gardens. In most cases the demand arose from our supplying schools with penny packets of seeds. In 1914, 25,000 penny packets were sold to the children of Brooklyn; in 1915, over 85,600 were sold. The seeds used in these packets are tested, and are of the best and most expensive varieties. Too often seeds sold to children are of inferior quality. The outcome from this work means eventually more and better gardens in Brooklyn. The round-up of this work is our annual exhibit held every September at the Garden. The trophy, a bronze statue of Victory, was for a second time won by P. S. 152. But this year public schools 98 and 43, dark horses in the race, gave 152 a hard fight for her place.

The way the children brought the products from their own gardens to the place of exhibit, is interesting. Public School 152

sent them in five autos; P. S. 129 came, one hundred strong, on the trolley, bringing their pots and boxes (fig. 2); P. S. 66 and P. S. 98 came by team over the road; P. S. 43 had an auto truck; and Canarsie represented neighborhood cooperation, for mothers, brothers, and big sisters brought their exhibit. At this exhibition the boys and girls who had garden plots at the Botanic Garden received prizes, but these children cannot enter their products in the exhibit. Their competition is among themselves.

FIG. 6. Children's gardens, 1915. Temporary location on site of Laboratory Building.

At this time the Garden Teacher's Association of the Brooklyn Botanic Garden, an organization formed by the first class to receive certificates in the course for teachers of school gardening, gave a prize, a bronze vase, to the boy or girl who had spent more than one season in the outdoor classes at the Brooklyn Botanic Garden, and who not only had done the best work, but had shown worthiness in other ways. This was won by Anna Pellicio of P. S. 9. The prizes were awarded October 9th, and a short address was given by Mr. John Lewis Childs, of Floral Park, chairman of the committee on awards.

Instruction for Teachers.—The course for teachers of gardening for children has grown from a class of seven in 1914, to a present membership of forty. On December fourth the following four young women received certificates. Miss Johanna Becker, head of department, P. S. 36; Mrs. Engerie McCord, of Brooklyn; Miss Maud Snedeker, P. S. 109, Brooklyn; and Miss Elsa Wolf, of Indianapolis. On this occasion, Miss Alice Fitts, Director of the Kindergarten Department of Pratt Institute, spoke on "Gardening in relation to the Child."

Two short courses for teachers have been added this past year; one in greenhouse work, the other in nature study in relation to the work laid down in the present city syllabus. These courses were planned for those who did not feel that they could take the longer or year's course. An outgrowth from this long course is the summer school work, to be put into operation in the summer of 1916; all the courses leading to the certificate for children's gardening will be condensed into a six weeks' summer course from July 5 to August 15.

Respectfully submitted,

EDGAR W. OLIVE,
Curator of Public Instruction.

REPORT OF THE LIBRARIAN FOR 1915

DR. C. STUART GAGER, DIRECTOR.

Sir: I have the honor to submit my report as librarian for the year ending December 31, 1915.

When I took up the work of reorganizing the library, on January 4, 1915, there had been a lapse of six months without an administrative officer for this department, and hence the duties of the present year, in addition to the care of incoming books, have had to cover the accumulated material received between March and December, 1914, most of which was still stored in packing boxes. The preparation of a statistical report for 1914 on unrecorded accessions required the personal examination of between three and four thousand books and pamphlets to secure tabular data for publication, and it was not until after the completion of

this task that a more systematic ordering of library affairs could be taken up in detail.

Attention was then given to the binding of complete volumes of botanical journals and paper-covered books; to the filling out of lacunae in sets of periodicals; to the classification of the library; to the bringing down to date of the accession book and the pamphlet catalog; to the revision of the dictionary catalog; to the making of a classified shelf catalog; to the gathering in of new publications, and the replenishing of technical supplies.

The year just closing has been marked by a certain amount of definite progress in the growth and efficiency of the library. While the inadequacy of the library appropriation has not permitted large or expensive purchases, and while the gifts received have not reached the number or the value shown by last year's record, yet the rate of increase has been fully up to the norm, the most pressing needs of the staff have been satisfied and works of permanent value have been added to our shelves.

Accessions in 1915

First among the valuable accessions by which our library has been enriched during the past year stands the generous donation from the Hoagland Bacteriological Laboratory, consisting of one hundred and forty-two volumes of *Comptes Rendus de l'Académie des Sciences* (Paris), and eight volumes of the *Journal of the Royal Microscopical Society of London.* The file of the rare *Comptes Rendus* is unbroken from its beginning in 1835 down to 1903, and it is important that the volumes from 1904 to 1915 inclusive be secured and that our subscription for current issues be placed as soon as possible.

Your librarian would call attention to the names of donors to the library in 1915, as exhibited in the tabular statistics. Mr. Frank D. Collins's gift of fifty-three separates represents all of his shorter papers on algae. These he has kindly collected and presented to us, and we have completed the Collins bibliography by our purchase from Tufts College of his Green Algae of North America. From Professor E. B. Wilson, of Columbia University, we received twenty-three of his monographs on cytology; from the Sapporo Agricultural College, Japan, came four large

volumes of the *Journal of the Tohoku Imperial University,* 1903–1914; from Mr. Joseph H. Colyer, we were favored with a gift of Patrick Browne's Civil and Natural History of Jamaica, 1789; from Mr. J. T. Underwood, the recently published twelve volume set entitled Luther Burbank, his Methods and Discoveries. Our largest donor is the United States Department of Agriculture, from which department we have received, besides periodicals coming regularly, twenty-four volumes and three hundred and eighty-two parts. Our thanks are due, in particular, to Mr. E. W. Allen, editor of the *Experiment Station Record,* for his unfailing courtesy in response to our requests, and for his generous gift of ten volumes and thirty-two numbers of the *Record,* some of which parts are out of print, and of the General Index to v. 13–25, an index which makes available the literature of all the state experiment stations as well as the file of the *Record* itself. Our set of the *Experiment Station Record* is now fully completed, has been well bound in black buckram and is available for consultation on our shelves. Mention should also be made of the Statistical Atlas of the United States, 1914, a copy of which, although the work is listed for sale, was presented to our library by Director S. F. Rogers, of the United States Bureau of the Census.

Among our noteworthy accessions secured by purchase or exchange, of first importance is a set of the *Botanical Gazette,* v. 1–29; the back volumes of the *Bulletin,* the *Contributions* and the *Journal* of the New York Botanical Garden needed to complete our files; the valuable bibliographies issued by the John Crerar Library, Chicago; and a small but highly interesting collection from Yokohama, consisting of a score of books on the flora of Japan and Japanese landscape gardening. In this lot are three folio volumes by Josiah Conder, entitled Landscape Gardening in Japan and Floral Art of Japan, with illustrations by well-known Japanese artists. A number of single works of considerable interest have been obtained; among these are J. D. Hooker's Himalayan Journals, 2 vols., London, 1854, bound in full blue calf; Hortus Collinsonianus, an Account of the Plants cultivated by the late Peter Collinson, Swansea, 1843, bound in full vellum; Thomas Meehan's Native Flowers and Ferns of the United

States, 1878–80; H. G. Miner's Orchids, 1885; William Hillebrand's Flora of the Hawaiian Islands, 1888; Hermann Müller's Fertilization of Flowers, tr. by D'Arcy W. Thompson, 1883; W. H. Harvey's A Manual of the British Marine Algae, 1849; E. F. Smith's Bacteria in Relation to Plant Diseases, v. 2, 3, 1911–1914; Ernst Küster's Pathological Plant Anatomy, tr. by F. Dorrance, 1914. Some twenty or more volumes have been added to our material on evolution and plant breeding, including Arnold Lang's Die experimentelle Vererbungslehre in der Zoologie seit 1900, erste Hälfte, 1914.

Our library now numbers 3,804 volumes and 5,885 pamphlets. This count does not include current numbers of periodicals, which are bound when the volumes are complete, to be entered as fresh accessions on their return from the binder. Reference to the statistical tables at the end of this report shows that the total increase in volumes and pamphlets received since December 31, 1914, amounts to 3,006 publications.

On comparing the highest number in the accession catalog December 31, 1915,—namely 2,960—with the number of volumes shown by our statistical table to be actually in the library,—namely 3,804,—it should be explained that the books transferred by the Central Museum in November, 1913, to the Brooklyn Botanic Garden, and numbering between eight and nine hundred volumes, are not entered on our accession book as the property of the library.

Periodicals

Special stress has been laid on making our files of current periodical literature as rich as possible. Partly through fresh subscriptions and by gift, but much more by means of setting up new exchanges with the Garden publications, our serial list has been increased this year by more than one hundred titles. Among the more important additions in the line of current periodicals may be mentioned the *Proceedings* of the National Academy of Sciences, Baltimore; the Bulletins of the International Institute of Agriculture at Rome, Italy, and the Bulletins of the Canadian branch at Ottawa; the *Journal* of the Royal Horticultural Society, London; *Annals* of the Bolus Herbarium, South African College, Cape Town; *Nyt Magazine for Naturvidenskaberne,* Christiania;

Zeitschrift für Pflanzenzüchtung, Berlin; *American Journal of Science,* New Haven; *Biological Bulletin* of the Marine Biological Laboratory, Woods Hole, Mass. Our current periodical list has now reached the number of 224 titles.

With a view to making our library more efficient in service and to securing a larger degree of cooperation with the libraries of the city, typewritten copies of our periodical list have been twice sent out to six of the libraries in Greater New York, with a request for return favors. Appreciative acknowledgments have been received from each of these libraries, and printed or type-written lists of currently received serial publications have come from the Montague Branch of the Brooklyn Public Library, the New York Public Library, the New York Botanical Garden and the Children's Museum. It is gratifying to state that occasionally some research student from out of town visits the Garden solely to consult some periodical not to be found in any one of the larger libraries of New York.

Grateful acknowledgment is herewith made to the Brooklyn Public Library for the regular deposit, month by month, in the Garden library, of *Annals of Botany* and *Curtis's Botanical Magazine.* By special courtesy of the board of trustees of the Brooklyn Public Library, the current issues of these journals, which are invaluable in our reference work, are now sent to the Garden as published, and bound by us when the volumes are complete.

Early in the year it was discovered that, in the absence of a librarian, the subscription to a number of our foreign periodicals had lapsed; some not having been received since early in 1914. The difficulty of getting shipments from Europe has complicated the situation, but with the helpful cooperation of our foreign agent these irregularities have been straightened out, and nearly all of our French, German, Italian and Scandinavian periodicals are now currently received, with no greater delay than is to be expected while the war is on.

For the periodical cases, japanned tin label-holders 2×12.5 cm. have been bought and fitted with typewritten labels, so that each of our current serials arranged in alphabetical order on the shelves has its own title standing out distinctly above it. The

card catalog for periodicals has been revised, completed and typed. All desired data concerning each journal may be seen by a glance at the card.

Experiment Station Literature

An intensive effort has been made to secure as complete files as possible of the bulletins, circulars and reports of the various state experiment stations throughout the country. Letters have been sent to the directors of all of these stations inviting them to send us regularly their current publications in exchange for current issues of the Garden RECORD, *Contributions,* and *Leaflets.* The response has been most gratifying, and exchange relations have now been set up with forty-four state experiment stations. Not only do we receive all of their current publications as issued, but the directors and librarians of these stations have shown the most courteous interest in filling out our sets of experiment station literature. Occasionally in exchange for back numbers of our publications, but much oftener by gift, we have obtained from these forty-four states bulletins, circulars and reports to the number of 35 volumes, 10 pamphlets and 890 single numbers. This material covers a wide range of subjects, many of which are more or less closely correlated with the work of the Garden, and can be made fully available to readers by means of the admirable indexes issued on cards and in book form by the United States Department of Agriculture. Furthermore, through the medium of the States Relations Service at Washington, this library is now receiving regularly the bulletins and reports of the experiment stations at Alaska, Guam, Hawaii, and Porto Rico.

It is pleasant to state that last March, in response to our urgent request and representations to the United States Department of Agriculture, this library was made a regular depository for all *Farmers' Bulletins.* Since that time these bulletins have been mailed to us as soon as published. Not only do we have the advantage of receiving them two or three weeks earlier than when we apply by means of the checked *Monthly List of Publications,* but the danger of the supply being exhausted before our application is received at Washington is obviated.

Binding

Much time and attention has been given to the matter of binding, for the proper binding of books and periodicals means a great deal for the convenience of the staff, and the treatment by a binder of books which are to be read in a reference library touches an entirely different set of problems from those which concern a loan library. As shown in our tabular conspectus, 322 volumes have been sent to the binder, each volume collated and accompanied by a slip giving minute directions as to material, color, scheme of lettering, form of binding, and so forth, each lot of books accompanied by a letter covering all points not mentioned on the slips. Two or three times your librarian has visited the bindery to inspect the work in person, and the foreman makes calls at our library for consultation in questions of doubt. There has been set up a reciprocal cooperation between the library and the bindery which is giving satisfactory results. This opportunity may be taken to express to the Chivers Book Binding Company our appreciation of the interest and loyalty which they have shown in the execution of our orders. Among the more important sets which have been bound are the *Experiment Station Record, Contributions from the United States National Herbarium,* the *Botanical Gazette,* the *Plant World, International Catalogue of Scientific Literature: Botany, Mycologia,* and *Biometrika.* The two volumes of Index Kewensis and the Supplements, nos. 1–4, 1886–1910, have been bound in three fourths dark green Nigerian morocco, in three volumes. The technical work of the binding is extremely good; the volumes open flat as they lie on the table and can be most conveniently referred to in the herbarium, where they are in hourly use. A strenuous effort has been made to complete for binding sets of periodicals where parts were missing, as in case of the earlier volumes of the *Botanical Gazette,* and letters have been written to many book dealers to secure back numbers.

Much more binding remains to be done; ragged shelves are still in evidence, and our botanical literature is much more difficult of access than if fully bound. As rapidly as funds become available, the remaining unbound sets of journals and society

transactions should be prepared for the binder, together with many paper-covered books and pamphlets which are worthy of a permanent place in our classified groups.

Summary of Work

Summing up in brief the work of this department for 1915, it must be said that while the amount accomplished falls short of what was planned, yet in the lack of a full-time library assistant perhaps little more could have been done.

In addition to accessioning and putting through the various processes of the library mill the 771 volumes and 2,235 pamphlets received in 1915, we have entered about 1,356 single numbers of current publications which are received monthly, weekly or daily, making a total of 4,362 fresh publications which have passed through our hands this year. Moreover, the 3,514 publications received in 1914 had to be in part entered, and in part examined for statistics, besides the 2,000 pamphlets already in the library, so that more than 9,800 publications have been worked over during the year.

The accession catalog, which records books in the chronological order of their receipt, has been brought down to date, covering the entry of 1,898 volumes. The last entry which had been made was on March 17, 1914, so that our year's record includes the accessioning of all books received between that date and December 31, 1915. Small lots can now be entered on the day of receipt, unless there is an unusual pressure of library work, and larger collections within a few days after receipt.

The system of classification outlined during the administration of Miss Stelle has this year been worked out in detail, and all bound books have been classified, or re-classified, and shelf-listed, except the sets of periodicals and society transactions. It is felt that a highly-specialized library like that of the Brooklyn Botanic Garden should have a classification sufficiently elastic to permit of expansion in all departments, and in assigning class numbers the future growth of the library has always been kept in mind even at the risk of making a call number less simple in its notation than the needs of the present moment demand. A shelf-

list on cards has been made by Miss Tikiob, the cards being arranged by class number and by book number in the order in which the books stand on the shelves. This gives us a sort of classed catalog, by means of which all titles may be seen at a glance in their natural clusters, without going to the stacks. The shelf-list also enables the librarian to take stock, yearly or semi-yearly, of the contents of the library and to check up missing volumes.

For shelf labels it was decided to use the gummed letters and figures of the Tablet and Ticket Company. The work of labeling has been done by Miss Mann, and the result is entirely satisfactory, as the sharply outlined black letters stand out clearly and effectively on a white card.

The Annie Morrill Smith library has been unpacked, counted, fully classified, shelf-listed and partly catalogued; pamphlets have been sorted and arranged in pamphlet boxes; typed lists have been made for volumes, pamphlets, and sets of periodicals, and duplicate copies of these lists have been sent to Mrs. Smith.

An author catalog for monographs in pamphlet form is being made by Miss Tikiob, and will soon be complete. Almost 1,000 cards have already been filed in this pamphlet catalog. The card catalog for current periodicals has been revised, completed and typed. A careful revision of the subject headings for the dictionary catalog has been made and 1,107 additional cards filed. Unbound periodicals and proceedings of scientific societies have been arranged in alphabetical order, and volumes waiting to be bound have been tied up with tape in such manner as to be readily accessible; United States documents and state publications have been grouped by departments and sub-grouped in order of publication.

Library Furniture

At the opening of the year, hundreds of volumes still lay packed in the boxes in which they had come to us, simply because of our inadequate shelf accommodations. To meet this need, three additional double-faced standard bracket steel stacks from the Library Bureau have been installed. At first sight it seemed as if our already overcrowded temporary quarters could hold no more, but by moving each book stack slightly forward and by

calculating floor space closely to the half inch, it was found possible to introduce the additional stacks without congesting the space for readers. An improved Library Bureau truck has been purchased which is invaluable for moving books and for functioning as a temporary bookcase to stand at the librarian's desk while books are being entered and catalogued. The truck is of quartered oak and has rawhide bumpers and wheels with fiber tires, making it practically indestructible, while it revolves at a touch and can be moved around corners with ease.

Readers

Our reading constituency includes, besides members of the Garden staff, various teachers, persons interested in house gardens, and an occasional research student. We can hardly expect, however, to reach many persons outside the Garden while the library is housed in these temporary quarters. A room having floor space of only 34×22 feet and serving as a stack room, an administration and work room, a reference department, and the librarian's office, where collation, packing for binder, dictation of letters, and all other library processes must go on, cannot have the character of a typical reading room. The readers in 1915 numbered 1,027, and 246 volumes were loaned to members of the staff. Sixteen volumes were loaned to the Biological Laboratory at Cold Spring Harbor for summer class work. Four publications have been borrowed from the Library of Congress for a period of twenty days for the use of one of the members of our staff.

Library Assistants

During a large part of the year, Miss Mann has given two hours a day to the work of the library, in typing cards for the dictionary catalog, in making shelf labels, in caring for periodicals, in technical processes such as embossing, dating, cutting leaves, and many other matters. Miss Tikiob has assisted regularly for one hour a day, and during a few weeks for several hours daily. In addition to regular stenographic work relating to correspondence, she has typed the shelf list and pamphlet catalog directly from the title-pages, and has made in all more than 2,000 cards.

Work to Be Done

Among the essential pieces of work to be done in 1916 should be mentioned the filling up of gaps in our sets of periodicals and the completing of our files by purchase or exchange; the cataloging of duplicates so that an opportunity for sale or exchange may quickly be taken advantage of; the completion of the dictionary catalog; the analysis of books by chapters and sections so that all material on a given subject may be made available; and the assigning of subject headings to pamphlet cards.

Tabular Statistics

Accessions, 1915

	Volumes	Pamphlets	Parts
By purchase	396	3	150
By gift	308	306	1,401
By exchange	65	116	222
By publication	0	35	2
By deposit	2	0	0
	771	460	1,775

Total of publications added to the library in 1915, exclusive of current periodicals	3,006
Grand total of fresh publications received in 1915, including current issues of serials	4,474
Total number of volumes in the library December 31, 1914	3,033
Volumes added in 1915	771
Total number of volumes in the library December 31, 1915	3,804
Total number of pamphlets in the library December 31, 1914 (approximate count)	3,650
Pamphlets added in 1915	2,235
Total number of pamphlets in the library December 31, 1915	5,885
Total number of volumes and pamphlets in the library December 31, 1914	6,683
Total number of volumes and pamphlets in the library, December 31, 1915	9,689
Increase in number of publications	3,006

Serial Publications

Count of periodicals, state and government publications, and society transactions currently received in the library:

By subscription	30
By gift	26

By exchange	159
By transfer from the Brooklyn Museum	2
By deposit from the Brooklyn Public Library	2
By publication	5
	224

Printed Cards

Index cards of the United States Experiment Stations on file in the library December 31, 1914	5,967
Experiment Stations index cards added by purchase in 1915	223
Total number of Experiment Stations index cards on file in the library December 31, 1915	6,190
Torrey Botanical Club index cards on file in the library December 31, 1914	21,286
Torrey Botanical Club index cards added by purchase in 1915	1,687
Total number of Torrey Botanical Club index cards on file December 31, 1915	22,973
Number of cards of Index algarum universalis, issues 1–4, received in 1915	2,400
Photographic negatives on file December 31, 1914	1,436
Negatives accessioned in 1915	322
Total number of negatives on file December 31, 1915	1,758
Lantern slides on file December 31, 1914	1,406
Lantern slides accessioned in 1915	239
Total number of lantern slides on file December 31, 1915	1,645

Miscellaneous Statistics for 1915

Volumes entered in accession catalog	1,898
Volumes classified and shelf-listed	1,562
Cards typed for shelf-list	1,185
Cards added to dictionary catalog	1,107
Cards made for catalog of pamphlets	953
Cards added to current periodical catalog	164
Volumes sent to binder	322
Books loaned to members of the Garden staff	246
Numbers of readers in the library	1,027
Number of letters written	351

Names of Donors, 1915

	Volumes	Pamphlets
Alabama Agricultural Experiment Station, Auburn		42
Allt, W. S., Brooklyn		5
American Social Hygienic Association, New York		1
Andrews, F. M., Bloomington, Indiana		1

Arizona Agricultural Experiment Station		10
Arkansas Agricultural Experiment Station		34
Atkinson, G. F., Ithaca, N. Y.		33
Austen, Mrs. P. T., Brooklyn	1	
Bates, J. M., Red Cloud, Nebraska		1
Biological Laboratory, Cold Spring Harbor, L. I.		3
Bovie, W. T., Boston, Mass.		8
Bridgman, H. L., Brooklyn, N. Y.	1	
Brooklyn, N. Y., Department of Parks		1
Brooklyn, N. Y., Postmaster		2
Brooklyn Institute of Arts and Sciences, Brooklyn Museum	32	198
Cambridge, University of, Cambridge, Eng.		1
Canada. Department of Agriculture, Ottawa	5	38
Canadian Forestry Association		2
Carnegie Institution of Washington	1	
Collins, F. D., Easthampton, Mass.		53
Colyer, J. H., Brooklyn, N. Y.	1	
Cornell University Agric. Expt. Station, Ithaca, N. Y.		6
Davenport, W. B.		1
Delaware Agricultural Experiment Station		19
Eichholz, Barbara, New York	1	
Florida Agricultural Experiment Station, Gainesville	2	105
Free, Montague, Brooklyn, N. Y.	3	5
Gager, C. Stuart, Brooklyn, N. Y.	11	96
Hoagland Bacteriological Laboratory, Brooklyn, N. Y.	150	
Illinois State Museum of Natural History, Springfield	2	
India Agri-Horticultural Society, Alipur		1
Indiana Agricultural Experiment Station, Lafayette		65
John Crerar Library, The, Chicago, Ill.	4	1
Kentucky Agricultural Experiment Station, Lexington		21
Library Bureau, New York	1	2
Maiden, J. H., Sydney, Australia		2
Maine Agricultural Experiment Station, Orono	4	5
Massachusetts Agricultural Experiment Station, Amherst.	1	9
Massachusetts. State Forester, Boston		1
Meyer, A. J., Columbia, Mo.		1
Miami University, Oxford, Ohio		1
Minneapolis (Minn.) Board of Park Commissioners	1	
Missouri Agricultural Experiment Station, Columbia		42
Missouri Botanical Garden, St. Louis		6
Moore, Emmeline, Poughkeepsie, N. Y.		1
National Academy of Sciences, Boston		1
New Hampshire Agricultural Experiment Station, Durham		25
New Jersey Agric. Experiment Station, New Brunswick		57
New Jersey Geological Survey, Trenton		1

New York (City), Board of City Record	2 (in nos.)	
New York (City) Board of Estimate and Apportionment	1 (in nos.)	
New York (State) Agric. Experiment Station, Geneva	8	17
New York (State) Col. of Agric., Cornell University, Ithaca		29
New York (State) Conservation Commission, Albany		14
New York (State) Univ. of the State of New York, Albany	1	
New York Botanical Garden		7
Osterhout, W. J. V., Cambridge		10
Rhode Island Agricultural Experiment Station, Kingston.	11	
Rijks University, Utrecht, Holland	1	
Rowe, F. W., Washington, D. C.		2
Sanborn, Mrs. G. C., Brooklyn		2
Schneider, F., Brooklyn	1 (in nos.)	
Schofield, P. F., New York		1
Shaw, Miss M. E., Brooklyn		2
Sinnott, E. W., Jamaica Plain, Mass.	1	7
Smith, Mrs. H. M.	5	24
Smithsonian Institution, Washington, D. C.	1	1
South Dakota Agricultural Experiment Station, Brookings		40
Storrs Agricultural Experiment Station, Storrs, Conn.		20
Tansley, A. G., Cambridge, Eng.	1	
Tohoku Imperial University, Sapporo, Japan	4	6
Underwood, J. T., New York	12	
United States. Bureau of the Census, Washington, D. C.	1	
United States. Dept. of Agriculture, Washington, D. C.	9	382
United States. Dept. of Agric. Office of Expt. Stations.	10	32
United States. Department of Agriculture. Weather Bureau, Washington, D. C.	5	
United States National Museum	1	2
United States Brewers Association, New York	1	
Utah Agricultural Experiment Station, Logan		59
Vermont Agricultural Experiment Station, Burlington	5	100
Washington Agricultural Experiment Station, Pullman		99
West of Scotland Agricultural College, Glasgow		1
White, Alfred T., Brooklyn, N. Y.	2	
Wilson, Prof. E. B., New York	4	19
The H. W. Wilson Company, White Plains, N. Y.		4
York, H. H., Providence, R. I.		1

In closing this report, I desire to express my full appreciation of the work done by my predecessors in office, Miss Stelle and Miss Fossler. I wish also to thank the members of the staff for

valuable suggestions as to publications to be secured, and for special lists of books recommended for the building up of the collections in the library of the Garden.

Respectfully submitted,

LAURA E. W. BENEDICT,
Librarian.

FINANCIAL STATEMENTS FOR 1915

1. MUNICIPAL ACCOUNT

1360	*Personal Service:*		
	Appropriation		$28,500.00
	Contributed from private funds		2,692.57
			31,192.57
	Expended		31,192.11
	Balance, December 31, 1915		.46
1361	*Supplies:*		
	Appropriation		$ 4,550.00
	Transferred from 1365	$ 22.91	
	Contributed from private funds	276.40	299.31
			4,849.31
	Transferred to 1362	$ 98.39	
	Transferred to 1368	141.00	
	Transferred to 1364	.70	
	Transferred to 1370	8.07	248.16
	Expended		4,601.15
1362	*Purchase of Equipment:*		
	Appropriation		$ 1,700.00
	Contributed from private funds	$102.50	
	Transferred from 1361	98.39	
	Transferred from 1363	42.17	243.06
			1,943.06
	Transferred to 1364		3.99
			1,939.07
	Expended		1,939.07
1363	*Materials:*		
	Appropriation		400.00
	Transferred to 1362	$ 42.17	
	Transferred to 1370	14.91	57.08
			342.92
	Expended		342.92

1364	*General Repairs:*		
	Appropriation		$ 500.00
	Transferred from 1361	$ .70	
	Transferred from 1362	3.99	4.69
			504.69
	Expended		504.69
1365	*Light, Heat and Power:*		
	Appropriation		$ 100.00
	Transferred to 1361	$ 22.91	
	Transferred to 1370	5.73	28.64
			71.36
	Expended		71.36
1366	*Hire of Horses and Vehicles with Drivers:*		
	Appropriation		$ 45.00
	Expended		45.00
1367	*Hire of Horses and Vehicles without Drivers:*		
	Appropriation		$ 454.50
	Expended		454.50
1368	*Expressage and Deliveries:*		
	Appropriation		$ 325.00
	Transferred from 1361	$141.00	
	Contributed from private funds	27.98	168.98
			493.98
	Expended		493.98
1369	*Communication:*		
	Appropriation		$ 150.00
	Contributed from private funds		.77
			150.77
	Transferred to 1370		31.95
			118.82
	Expended		118.82
1370	*Contingencies:*		
	Appropriation		$ 350.00
	Transferred from 1361	$ 8.07	
	Transferred from 1363	14.91	
	Transferred from 1365	5.73	
	Transferred from 1369	31.95	60.66
			410.66
	Expended		410.66

1371 *Insurance:*

Appropriation		$ 50.00
Expended		0.00
Balance, December 31, 1915		$ 50.00

Summary of Municipal Account:

Appropriation by City for maintenance	$37,124.50
Contributed from private funds	3,100.22
	40,224.72
Expended	40,174.26
Balance, December 31, 1915	$ 50.46

2. Private Funds Accounts for 1915

1. *Endowment Fund, Income Account:*

Balance, January 1, 1915		$ 109.88
Income, 1915		2,589.42
Special Contributions		3,013.86
		5,713.16
Contributed to Maintenance Accounts	$ 556.37	
Expended	5,032.57	5,588.94
Balance, December 31, 1915		$ 124.22

2. *Botanic Garden Collection Fund, 1915:*

Received, 1915	$ 1,644.00
Expended	1,644.00

3. *Special Contributions:*

Received		$ 6,223.04
Contributed to Maintenance Accounts	$2,543.85	
Expended	3,669.47	6,213.32
Balance, December 31, 1915		$ 9.72

4. *Cary Library Fund:*

Received	$ 77.75
Expended	0.00
Balance, December 31, 1915	$ 77.75

5. *George C. Brackett Library Fund:*

Balance, January 1, 1915	$ 13.81
Income, 1915	25.00
	38.81
Expended	26.90
Balance, December 31, 1915	$ 11.91

6. *Sustaining Membership Account:*

Balance, January 1, 1915	$ 23.00
Received, 1915	260.00
	283.00
Expended	279.70
Balance, December 31, 1915	$ 3.30

7. *Annual Membership Account:*

Received, 1915	$ 670.00
Expended	478.03
Balance, December 31, 1915	$ 191.97

8. *Special Contribution—Japanese Garden Account:*

Balance, January 1, 1915	$ 14.06
Received, 1915	1,256.80
	1,270.86
Expended	1,270.86

9. *Tuition and Sales Account:*

Received		
(*a*) Instruction		$ 313.75
(*b*) Penny seed-packets		856.13
(*c*) Incidentals		
Balance, January 1, 1915	$ 19.84	
Received, 1915	9.30	29.14
		$1,199.02
Expended		
(*a*) Instruction	$ 476.06	
(*b*) Penny seed-packets	476.50	
(*c*) Incidentals	125.61	1,078.17
Balance, December 31, 1915		120.85

Summary of Private Funds Accounts:

Balance, January 1, 1915	$ 180.59
Income, 1915	16,939.05
	17,119.64
Expended	16,579.92
Balance, December 31, 1915	539.72

APPROPRIATIONS OF CORPORATE STOCK OF THE CITY OF NEW YORK FOR PERMANENT IMPROVEMENTS, AND EXPENDITURES THEREFROM DURING 1915

C.D.P. 200J. ($40,000.00.) For Grading, Draining, Piping, and Soil Improvements

Balance, January 1, 1915		$1,042.65
Expenditures:		
Norton & Gorman Contracting Company		
Top Soil and Manure		949.45
Balance, December 31, 1915		93.20

C.D.P. 200K. ($30,000.00.) For Construction of Roadways, Walks, Stone Steps, and Paving

Balance, January 1, 1915		$5,012.00
Expenditures:		
Louis J. Sieling, grading	$4,358.47	
Olmsted Brothers, landscape architects	228.28	4,586.75
Balance, December 31, 1915		425.25

C.D.P. 200L. ($100,000.00.) For Buildings

Balance, January 1, 1915	$5,789.31
Expenditures	0.00
Balance, December 31, 1915	$5,789.31

APPENDIX 1

PUBLICATIONS OF MEMBERS OF STAFF DURING 1915

Free, Montague

—— A scale insect on nephrolepis. Florists' Exchange **39**: 236; Jan. 30th.

—— Iris tingitana. *Horticulture* **21**: 172; Feb. 6th.

—— Rhipsalis pachyptera. *Ibid.* **21**: 270; Feb. 27th.

—— Some beautiful Irises. *Ibid.* **21**: 303; March 6th.

—— Plants for hanging baskets. *Brooklyn Bot. Gard. Leaflets* **III**[3]. May 5th.

—— Euphorbia epithymoides. *Florists' Exchange* **39**: 236; June 30th.

—— Saxifraga irrigua. *Ibid.* **40**: 88; July 10th.

—— Selaginellas. Horticulture **22**: 35; July 10th.

—— Lythrum virgatum. *Florists' Exchange* **40**: 764; Oct. 2nd.

—— House plants. *Brooklyn Bot. Gard. Leaflets* **III**[12]. Oct. 27th.

—— The Brooklyn Botanic Garden. *Journal of the Kew Guild* **22**: 219–222.

Caparn, H. A., and Taylor, N.

—— Planting a botanic garden. *Landscape Architecture* **5**: 157–163. July.

Gager, C. Stuart

—— Calkin's Biology (Review). *Torreya* **15**: 50–53. March.

—— Fourth Annual Report of the Brooklyn Botanic Garden. *Brooklyn Bot. Gard. Record* **4**: 17–45. April.

—— Rare cycads from Australia. *Ibid.* **4**: 83–92. July.

—— Dixon's Transpiration and the Ascent of Sap in Plants (Review). *Torreya* **15**: 209–211. September.

—— Ballot for names for the exterior of the laboratory building. *Brooklyn Bot. Gard. Record.* **4**: 105–123. October.

—— School gardening in Philadelphia. *Ibid.* **4**: 125–126. October.

Shaw, Ellen Eddy

—— Plants for school rooms. *Nature Study Review.* **2**: 2. February.

—— List of talks for elementary school classes. *Brooklyn Bot. Gard. Leaflets* **3**[1]: April 7th.

—— The second annual children's garden exhibit. *Ibid.* **3**[2]. April 21st.

—— The children's garden exhibit. *Ibid.* **3**[7]. Sept. 15th.

—— Talks for elementary schools. *Ibid.* **3**[9]. Oct. 6th.

Taylor, N.

—— Flora of the vicinity of New York. A contribution to plant geography. *Mem. N. Y. Bot. Gard.* **5**: 1–683. January.

—— The growth-forms of the flora of the vicinity of New York. *Am. Jour. Bot.* **2**: 23–31. January.

—— The African bow-string hemp. *Brooklyn Bot. Gard. Record* **4**: 12–14. January.

—— Shreve's Montane Rain Forest (Review) *Torreya* **15**: 53–54. March.

—— Trevena's Adventures among wild flowers (Review). *Ibid.* **15**: 55. March.
—— Kraemer's Applied and Economic Botany (Review). *Ibid.* **15**: 80–82. April.
—— Report of the curator of plants. *Brooklyn Bot. Gard. Record* **4**: 47–51. April.
—— A walk through the Garden. *Brooklyn Bot. Gard. Leaflets* 3^{2}. April.
—— A hundred native perennials for the wild garden. *Garden Magazine* **21**: 214–215. May.
(—— and) Caparn, H. A. Planting a botanic garden. *Landscape Architecture.* **5**: 157–163. July.

White, Orland E.
—— The origin and history of some of our more common garden vegetables. *Brooklyn Bot. Gard. Leaflets* 3^{6}. pp. 12. Figs. 1–5. June 30th.
—— The crossing of flowers. *Ibid.* 3^{10-11}. pp. 12. Figs. 1–8. October 13th.

APPENDIX 2

PUBLIC LECTURES, ADDRESSES, AND PAPERS GIVEN BY MEMBERS OF STAFF DURING 1915

By the director of the Garden:

March 4. *The Brooklyn Botanic Garden.* Colonia Club.
September 8. *Present status of the problem of the effects of radium rays on plant life.* N. Y. Botanical Garden. Twentieth Anniversary Exercises.
October 31. *Colonel Woodward and the Brooklyn Garden.* Memorial meeting, Academy of Music.
December 7. *What the Brooklyn Botanic Garden is doing for children.* New York Federation of Women's Clubs.
December 15. *Effects of electricity and radium rays on plants.* Rhode Island Horticultural Society, Providence.

By the curator of plants:

September 8. *A white cedar swamp on Long Island and its significance.* Twentieth Anniversary Exercises. New York Botanical Garden.

December 30. *Endemism in the flora of the vicinity of New York.* Botanical Society of America, Columbus, Ohio.

By the curator of plant breeding:

March 22. *Heredity, variation and environment with demonstration material.* Pratt Institute Class, Brooklyn Botanic Garden.

April 28. *Mendelism and its relation to the problems of evolution and heredity.* Torrey Botanical Club, New York Botanical Garden.

August 23. *The crossing of flowers.* Southampton Garden Club, Southampton, L. I.

September 9. *Studies of inheritance in Pisum.* Twentieth Anniversary Exercises. New York Botanical Garden.

By the assistant curator of public instruction:

February 14. *How to start a garden.* The Jewish Orphanage, Brooklyn.

February 22. *What the Brooklyn Botanic Garden does for the children of Brooklyn.* Brooklyn Woman's Club.

March 3. *Children's gardens.* High School, Princeton, N. J.

March 19. *Gardening at home.* Kindergarten Alumnae Association of The Ethical Culture School, Manhattan.

May 14. *Children's gardens.* National Plant, Flower and Fruit Guild, New Rochelle, N. Y.

June 17. *Children's gardens.* The Garden Club, Princeton, N. J.

June 21–26. *Five nature study lectures.* Summer School of Winthrop College, Rock Hill, S. C.

September 6–11. *Five nature study lectures.* Teachers Institute, Anderson, Ind.

October 26. *Nature study in the home.* Pratt Kindergarten Alumnae, Brooklyn.

By the head gardener:

October 25. *Alpine and rock plants.* Garden Club of Orange and Dutchess Counties, Cornwall, N. Y.

November 29. *Soils.* Natural History Club of Commercial High School, Brooklyn.

APPENDIX 3

BOARD OF ESTIMATE AND APPOINTMENT.

Resolution Adopted March 5, 1915, Approving Form of Contract, Etc., at a Cost of $5,078.25, for the Construction of Walks, Etc., in the Brooklyn Botanic Garden (Cal. No. 70).

The Secretary presented a communication dated February 2, 1915, from the Commissioner of Parks, Borough of Brookyln, requesting approval of form of contract, plans, specifications, etc., at an estimated cost of $5,078.25 for the construction of walks, etc., in the addition to the southerly end of the Brooklyn Botanic Garden; and the following report of the Bureau of Contract Supervision recommending approval thereof at an estimated cost of $4,350:

City of New York, Board of Estimate and Apportionment,
Municipal Building, Bureau of Contract Supervision,
March 2, 1915.

To the Board of Estimate and Apportionment:

Gentlemen: On February 3, 1915, you referred to the Bureau of Contract Supervision, a communication from the Commissioner of Parks, Borough of Brooklyn, dated February 2, 1915, requesting approval of plans, form of contract, specifications and estimates of cost, $5,078.25, for the construction of walks, etc., in the addition to southerly end of the Brooklyn Botanic Garden, Borough of Brooklyn.

It is proposed to charge the cost of the work to corporate stock funds entitled C.D.P. 200-J, Grading and Improvement, Brooklyn Botanic Garden, and C.D.P. 200-K, Construction of Roads, Walks, etc., Brooklyn Botanic Garden. This request provides for the construction of about 1,530 linear feet of asphalt walk, 15 feet in width, together with necessary sodding and topsoil and suitable provision for drainage, including vitrified pipe and catch basins.

The construction of about one half of this path is very necessary, as the public makes considerable use of a legal right-of-way from Washington avenue across this property to Flatbush Avenue, at Willwick entrance to Prospect Park, the property having been purchased subject to such right-of-way.

The plans, as submitted, provide for this path, and complete the system of walks and walk drainage, as designed by Olmstead Brothers, landscape architects of Brookline, Mass.

The fund C.D.P. 200-K, was authorized by the Board of Estimate and Apportionment on July 17, 1911, and concurred in by the Board of Aldermen on July 25, 1911, to the amount of $30,000. On March 1, 1915, there remained in this fund an unencumbered balance of $5,110.26, which is ample to complete the work for which approval is requested. The plans, contract, form and specifications as submitted were satisfactory, except as to the drainage plan, which was necessarily expensive. At the suggestion of the Bureau of Contract Supervision the landscape architect has amended the plans in this particular, and they are now satisfactory.

The estimate of cost as submitted, $5,078.25, is excessive. Owing to the change in plan, and excessive unit prices in the estimate, the cost should not exceed $4,350.

I recommend the adoption of the attached resolution granting the request, as amended.

Respectfully,

TILDEN ADAMSON,
Director.

The following resolution was offered:

Resolved, That the Board of Estimate and Apportionment hereby approves the contract, form, plans, specifications, all as amended, and estimate of cost, to an amount of forty-three hundred and fifty dollars ($4,350), for the purpose of the construction of walks and necessary drainage in connection therewith, in the addition to the southerly end of the Brooklyn Botanic Garden, Borough of Brooklyn, under the jurisdiction of the Commissioner of Parks, Borough of Brooklyn; the cost to be charged to the corporate stock fund C.D.P., 200-K, Construction of Roads, Walk, etc., Brooklyn Botanic Garden; and be it further

Resolved, That if no bids are received for such work within such estimated cost, the amount of such estimated cost upon the bids so received may be reconsidered in its discretion by the Board of Estimate and Apportionment or by any official designated by the Board, provided that any of such bids is within the amount authorized and available for such work.

Which was adopted by the following vote:

Affirmative.—The Mayor, the Comptroller, the President of the Board of Aldermen, the Presidents of the Boroughs of Manhattan, Brooklyn, The Bronx and Queens and the Acting President of the Borough of Richmond.—16 (*City Record* 43: 2316. 19 Mch 1915).

APPENDIX 4

BOARD OF ESTIMATE AND APPORTIONMENT

Resolution Adopted on June 11, 1915, Approving Transfers of Appropriations and Modification of Schedules for the Brooklyn Botanical Garden (Cal. No. 79)

The Secretary presented a communication dated May 25, 1915, from the Commissioner of Parks, Borough of Brooklyn, requesting a transfer within the appropriation for said department for 1915; and the following report of the Comptroller, recommending approval thereof and modification of schedules:

City of New York, Board of Estimate and Apportionment,
Municipal Building, Bureau of Contract Supervision,
June 3, 1915.

To the Board of Estimate and Apportionment:

Gentlemen: On May 26, 1915, you referred to me a communication from the Commissioner of Parks, Borough of Brooklyn, dated May 25, 1915, requesting transfer within the appropriations made for the Botanical Garden and Arboretum for the year 1915, as follows:

From

Supplies

1361 Botanical and Agricultural Supplies $141.00

To

Contract or Open Order Service

1368 Expressage and Deliveries $141.00

In preparing the budget for 1915 the sum of $325 was requested and allowed for "Expressage and Deliveries."

The Botanical Garden has recently purchased a large quantity of fertilizer, on which the freight and delivery charges amounted to $402. The transfer is requested to provide sufficient funds to meet this unforeseen expenditure.

There is sufficient excess unencumbered balance in account 1361 to permit of this transfer.

I recommend the adoption of the attached resolution granting the request and modifying the schedules involved.

Respectfully,
Wm. A. Prendergast,
Comptroller.

The following resolution was offered:

Resolved, That the Board of Estimate and Apportionment, pursuant to the provisions of section 237 of the Greater New York Charter, hereby approves of the transfer of funds appropriated for the Botanical Garden and Arboretum, Department of Parks, Borough of Brooklyn, for the year 1915, as follows:

FROM

Supplies

1361 Botanical and Agricultural Supplies.....$141.00

TO

Contract or Open Order Service

Transportation—

1368 Expressage and Deliveries $141.00

Which was adopted by the following vote:

Affirmative.—The Mayor, the Comptroller, the President of the Board of Aldermen, the Presidents of the Boroughs of Manhattan, Brooklyn, The Bronx and Queens and the Acting President of the Borough of Richmond—16.

The following resolution was offered:

Resolved, That the Board of Estimate and Apportionment hereby approves of the schedules, as revised for the Botanical Garden and Arboretum, Department of Parks, Borough of Brooklyn, for the year 1915, as follows:

1361	Supplies—		
	Fuel Supplies	$1,575.00	
	Office Supplies	950.00	
	Botanical and Agricultural Supplies	1,834.00	
	General Plant Supplies	25.00	
	Laundry, Cleaning and Disinfecting Supplies	25.00	
			$4,409.00
1368	Expressage and Deliveries		$ 466.00

Which was adopted by the following vote:

Affirmative.—The Mayor, the Comptroller, the President of the Board of Aldermen, the Presidents of the Boroughs of Manhattan, Brooklyn, The Bronx and Queens and the Acting President of the Borough of Richmond—16. (*City Record,* 43 : 5127. 25 June, 1915.)

APPENDIX 5

BOARD OF ESTIMATE AND APPORTIONMENT

Resolution Adopted by the Board of Estimate and Apportionment on March 3, 1916, Approving Transfers of Funds to the Amount of $201.92, Appropriated in the Tax Budget of the Brooklyn Botanic Garden for 1915.

Department of Parks, Borough of Brooklyn—Transfer of Appropriation (Cal. No. 42).

The Secretary presented a communication dated February 7, 1916, from the Commissioner of Parks, Borough of Brooklyn, requesting a transfer within the appropriation for 1915; and the following report of the Comptroller recommending approval thereof:

February 24, 1916.

To the Board of Estimate and Apportionment:

Gentlemen—On February 7, 1916, the Commissioner of Parks, Borough of Brooklyn, requested the transfer of $201.92 within the appropriations made to the Brooklyn Botanic Garden and Arboretum, for the year 1915.

The Bureau of Contract Supervision, to which the request was referred on February 9, 1916, reports thereon as follows:

"The proposed transfer of $136.57 to account 1362, General Plant Equipment, is for the purpose of meeting, in part, an outstanding bill for the installation of snow guards at the greenhouses, made necessary by the heavy fall of snow in December.

"The proposed transfer of $4.69 to account 1364, General Repairs, is required to meet, in part, an outstanding bill for emergency repairs to the greenhouses which were damaged by snow in December, 1915.

"The proposed transfer of $60.66 to account 1370, Contingencies, is made necessary by the fact that an allowance of $350, which was made for traveling expenses in the 1915 budget, has proved insufficient. This traveling was considered necessary and

was contemplated at the time the budget was adopted, but the estimated amount then allowed has proven to be less than the actual expenditure.

"There are sufficient balances in the debit accounts to meet the transfers."

I recommend the adoption of the attached resolution approving the request.

Respectfully,

WM. A. PRENDERGAST,
Comptroller.

The following resolution was offered:

Resolved, That the Board of Estimate and Apportionment, pursuant to the provisions of section 237 of the Greater New York Charter, hereby approves of the transfer of funds appropriated to the Brooklyn Botanic Garden and Arboretum, for the year 1915, as follows:

FROM

1361	Supplies	$ 84.25
1363	Materials	57.08
	Contract or Open Order Service	
1365	Light, Heat and Power	28.64
1369	Communication	31.95
		$201.92

To

	Purchase of Equipment	
1362	General Plant Equipment	$136.57
	Contract or Open Order Service	
1364	General Repairs	4.69
1370	Contingencies	60.66
		$201.92

Which was adopted by the following vote:

Affirmative.—The Acting Mayor, the Comptroller and the Presidents of the Boroughs of Manhattan, Brooklyn, The Bronx, Queens and Richmond—13.

APPENDIX 6

BOARD OF ESTIMATE AND APPORTIONMENT

Report of Commitee on Corporate Stock Budget, Presented at the Meeting of June 11, 1915, Recommending that an Authorization of $100,000 Corporate Stock for the Improvement of the Brooklyn Botanic Garden be Approved

Department of Parks, Borough of Brooklyn—Issue of Corporate Stock (Cal. No. 19)

The Secretary presented a report of the Committee on Corporate Stock Budget on the request of the Commissioner of Parks, Borough of Brooklyn, for an issue of $128,500 corporate stock for "Additions to the Botanical Garden Buildings."

The report states that on May 26, 1915, a check for $100,000 was deposited by Mr. Alfred T. White, who wrote to the Comptroller on May 11, as follows:

"I have secured by private subscription one hundred thousand dollars ($100,000) to be given to the City towards the completion of buildings and other development of the Brooklyn Botanic Garden, on the understanding that the City will appropriate an equal amount of Corporate Stock for a similar purpose."

At present the Brooklyn Botanic Garden buildings are greatly congested, and the facilities for carrying on the work are inadequate.

The acceptance under the conditions outlined in this offer at this time will provide funds sufficient for all improvements needed in the Botanic Garden for several years.

It is the opinion of the Committee that the generous offer made through Mr. White should be accepted.

It is recommended that an authorization of $100,000 corporate stock for the improvement of the Brooklyn Botanic Garden be approved.

(On January 29, 1915 (No. 115G), the above matter was referred to said Committee.)

The matter was laid over one week (June 18, 1915) under Rule 19. (*City Record* 43: 5107. 25 June, 1915.)

APPENDIX 7

BOARD OF ESTIMATE AND APPORTIONMENT

Action Taken on June 18, 1915, Approving the Authorization of an Issue of $100,000 Corporate Stock for the Improvement of the Brooklyn Botanic Garden

Department of Parks, Borough of Brooklyn—Issue of Corporate Stock for Additions to the Botanical Garden Buildings
(Cal. No. 117)

(On January 29, 1915 (No. 115G), the request of the Commissioner of Parks, Borough of Brooklyn, in this matter was referred to the Committee on Corporate Stock Budget.)

(On June 11, 1915 (Cal. No. 19), the report of the Committee on Corporate Stock Budget was presented to the Board, and the matter was laid over for one week, under Rule 19.)

The Secretary presented a communication, dated January 4, 1915, from the Commissioner of Parks, Borough of Brooklyn, requesting an issue of Corporate Stock, for various permanent improvements, one of the items, amounting to $128,500, calling for Additions to Botanic Garden Buildings; and the following report of the Committee on Corporate Stock Budget recommending approval thereof in the sum of $100,000:

City of New York, Board of Estimate and Apportionment,
Municipal Building, Bureau of Contract Supervision,
May 29, 1915.

To the Board of Estimate and Apportionment:

Gentlemen: On January 29, 1915, you referred to the Corporate Stock Budget Committee a communication from the Commissioner of Parks, Borough of Brooklyn, dated January 4, 1915, requesting the issue of corporate stock for various permanent improvements under the jurisdiction of his department for the year 1915.

One of the items requested was for "Additions to Botanic Garden Buildings, $128,500."

On May 1, 1915, a communication was received by the Comptroller from Mr. Alfred T. White, in which he stated as follows:

"I have secured by private subscription one hundred thousand dollars ($100,000) to be given to the City towards the completion of buildings

and other development of the Brooklyn Botanic Garden, on the understanding that the City will appropriate an equal amount of corporate stock for a similar purpose."

On May 26, 1915, a check for $100,000 was deposited by Mr. White with the Comptroller and temporarily placed to the credit of a Suspense Fund and is at present being held.

At present the Brooklyn Botanic Garden buildings are greatly congested, and the facilities for carrying on the work are inadequate. The necessity for improvement in the buildings, while perhaps not vitally urgent this year, is so great that the City will be compelled to expend in excess of $100,000 in making necessary improvements in the near future.

The acceptance under the conditions outlined in this offer at this time will provide funds sufficient for all improvements needed in the Botanic Garden for several years.

It is the opinion of your committee that the generous offer made through Mr. White should be accepted.

We recommend the adoption of the attached resolution approving the authorization of $100,000.

Respectfully,

WM. A. PRENDERGAST,
Comptroller;
O. GRANT ESTERBROOK,
Acting President, Board of Aldermen;
E. W. VOORHIES,
Acting President, Borough of Brooklyn;
DOUGLAS MATHEWSON,
President, Borough of the Bronx;
Corporate Stock Budget Committee.

The following resolution was offered:

Resolved, That the Board of Estimate and Apportionment, pursuant to the provisions of section 47 of the Greater New York Charter, as amended, hereby approves of the issue of corporate stock of The City of New York to an amount not exceeding one hundred thousand dollars ($100,000) to provide means for the improvement of the Brooklyn Botanic Garden, under the jurisdiction of the Department of Parks, Borough of Brooklyn, and that when authority therefor shall have been obtained from the Board of Aldermen the Comptroller be and is hereby authorized to issue said corporate stock of The City of New York in the manner provided by section 169 of the Greater New York Charter, maturing not more than fifteen (15) years after date of issue, the proceeds thereof to the amount of the par value of the stock to be applied to the purposes aforesaid; provided, how-

ever, that no encumbrance or expenditure by contract shall be made against the proceeds of corporate stock herein authorized nor shall bids upon such contracts be advertised for, until after approval by the Board of Estimate and Apportionment of the plans, specifications, estimates of cost, and forms of such contracts which shall be submitted to said Board by the Commissioner of Parks, Borough of Brooklyn, nor shall any architect, engineer, expert or departmental employee be engaged or employed as a charge against such proceeds except after approval by said Board of such employment and of the fee or wage to be paid by preliminary and final contract, vouchers, or budget schedule which are to be similarly submitted, unless in the case of departmental employees, such employment is in accordance with schedules approved by said board.

Which was adopted by the following vote:

Affirmative.—The Mayor, the Comptroller, the Acting President of the Board of Aldermen, the Presidents of the Boroughs of Manhattan, Brooklyn, The Bronx and Queens and the Acting President of the Borough of Richmond—16.

The President of the Borough of Brooklyn called the attention of the Board to the services rendered by Mr. Alfred T. White, in connection with this matter, and offered the following resolution:

Resolved, That the Board of Estimate and Apportionment of The City of New York hereby expresses to Mr. Alfred T. White its cordial appreciation of the services rendered by him to the City in connection with the Botanical Garden in the Borough of Brooklyn. The Board feels that the growth and development of the Botanical Garden is due in a large measure to the interest shown therein by Mr. White, who for years has aided the institution by his sympathy, advice and generous financial support.

Which was adopted by the following vote:

Affirmative.—The Mayor, the Comptroller, the Acting President of the Board of Aldermen, the Presidents of the Boroughs of Manhattan, Brooklyn, The Bronx and Queens and the Acting President of the Borough of Richmond—16. (*City Record* 43: 5455–5456. 7 July, 1915.)

The resolution was referred to the Board of Aldermen on June 22, 1915.

APPENDIX 8

BOARD OF ALDERMEN

Report of the Committee on Finance in Favor of Adopting Ordinance for $100,000 Corporate Stock for Improvement of Brooklyn Botanic Garden.
(No. 713—Int. No. 1885)

The Committee on Finance, to which was referred on June 22, 1915 (Minutes, page 812), the annexed resolution in favor of an issue of $100,000 Corporate Stock for the improvement of the Brooklyn Botanic Garden, respectfully

Reports:

That, having examined the subject, it believes the proposed appropriation to be necessary. A donation of $100,000 has been made by private subscription on condition that the City furnish an equal amount to complete this project. This is an opportunity the City should not lose, and the Committee recommends that the accompanying ordinance be adopted.

An Ordinance providing for an issue of corporate stock of The City of New York to an amount not exceeding one hundred thousand dollars ($100,000), to provide means for the improvement of the Brooklyn Botanic Garden, under the jurisdiction of the Department of Parks, Borough of Brooklyn.

Be it Ordained by the Board of Aldermen of The City of New York, as follows:

Section 1. The Board of Aldermen hereby approves of and concurs in the following resolution, adopted by the Board of Estimate and Apportionment June 18, 1915, and authorizes the Comptroller to issue corporate stock of The City of New York to the amount and for the purposes therein specified:

Resolved, That the Board of Estimate and Apportionment, pursuant to the provisions of section 47 of the Greater New York Charter, as amended, hereby approves of the issue of corporate stock of The City of New York to an amount not exceeding one hundred thousand dollars ($100,000) to provide means for the

improvement of the Brooklyn Botanic Garden, under the jurisdiction of the Department of Parks, Borough of Brooklyn, and that when authority therefor shall have been obtained from the Board of Aldermen the Comptroller be and is hereby authorized to issue said corporate stock of The City of New York in the manner provided by section 169 of the Greater New York Charter, maturing not more than fifteen (15) years after date of issue, the proceeds thereof to the amount of the par value of the stock to be applied to the purposes aforesaid; provided, however, that no encumbrance or expenditure by contract shall be made against the proceeds of corporate stock herein authorized nor shall bids upon such contracts be advertised for, until after approval by the Board of Estimate and Apportionment of the plans, specifications, estimates of cost, and forms of such contracts which shall be submitted to said Board by the Commissioner of Parks, Borough of Brooklyn, nor shall any architect, engineer, expert or departmental employee be engaged or employed as a charge against such proceeds except after approval by said Board of such employment and of the fee or wage to be paid by preliminary and final contract, vouchers, or budget schedule which are to be similarly submitted, unless in the case of departmental employees, such employment is in accordance with schedules approved by said board.

HENRY H. CURRAN,
JOHN DIEMER,
F. H. STEVENSON,
FRANK J. DOTZLER,
JESSE D. MOORE,
F. H. WILMOT,
C. AUGUSTUS POST,
FRANCIS P. KENNEY,
Committee on Finance

The Chairman pro-tem. put the question whether the Board would agree to accept said report and adopt said resolution.

Which was decided in the affirmative by the following vote:

Affirmative.—Aldermen Bartscherer, Bedell, Brush, Carberry, Chorosh, Colne, Crane, Cunningham, Diemer, Donnelly, Dotzler,

Dowling, Duggan, Dujat, Eichhorn, Ferguson, Ferrand, Eagan, Fink, Gaynor, Hogan, Igstaedter, Kenney, Kochendorfer, McCann, McCourt, Milligan, Molen, Moore (Chas. J.), Moore (Jesse D.), Moran, Mullen (Frank), Mullen (Jas. F.), O'Rourke, Ottes, Pendry, Post, Rosenblum, Smith, Squires, Stevenson, Taylor, Trau, Valentine, White, Wilmot, President Connolly, President Mathewson, President Marks; the Vice-Chairman—50.

Negative.—Aldermen Quinn and Schmelzel—2. (*City Record* 43: 5537. 8 July, 1915.)

The ordinance was approved by the Mayor on July 16, 1915.

APPENDIX 9

BOARD OF ESTIMATE AND APPORTIONMENT

Resolution Approving Specifications, etc., for the Completion of the Laboratory Building and Greenhouses.

(*From Minutes of Meeting of Sept. 24, 1915.*)

Department of Parks, Borough of Brooklyn—Approval of Contracts, Plans, Specifications, Etc. (*Cal. No. 51*)

The Secretary presented a communication dated September 3, 1915, from the Commissioner of Parks, Borough of Brooklyn, requesting approval of forms of contracts, specifications, plans and estimates of cost for the completion of laboratory building and greenhouses for the Brooklyn Botanic Garden, Borough of Brooklyn, at a total estimated cost of $170,000; and the following report of the Bureau of Contract Supervision recommending approval thereof:

City of New York, Board of Estimate and Apportionment,
Municipal Building, Bureau of Contract Supervision,
September 21, 1915.

To the Board of Estimate and Apportionment:

Gentlemen: On September 4, 1915, you referred to the Bureau of Contract Supervision a communication from the Commissioner of Public Parks, Borough of Brooklyn, dated September 3, 1915, requesting approval of the forms of contract, specifications, plans and estimates of cost for

the completion of the laboratory building and greenhouses for the Brooklyn Botanic Garden, Borough of Brooklyn, as follows:

General construction	$136,000
Heating and ventilating work	20,000
Plumbing work	14,000
Total estimated cost	$170,000

The cost is to be charged as follows: One half to the corporate stock fund "C.D.P. 200-M, Department of Parks, Borough of Brooklyn, Improvement of Botanic Garden," for which your Board approved an appropriation of $100,000 on June 18, 1915; and one half to the fund entitled "S. 566, Suspense Account, Contribution for Brooklyn Botanic Garden Improvement Fund," to which is credited a gift of $100,000, which has been made to the City through Mr. Alfred T. White.

The specifications for general construction include all excavation, masonry, iron and steel, carpentry, glazing, hardware, painting and electrical work. The Department of Water Supply, Gas and Electricity has approved the specifications and plans for this electrical work. The Bureau of Contract Supervision has suggested modification to the form of contract and specifications so as to provide for compensation for extra work on foundations in the event that unsuitable bottom is found at the depths shown on plans. Other slight modifications have been suggested to render the specifications more specific. These suggested modifications have been agreed to by the architect and the Department of Parks, Borough of Brooklyn. As amended, the specifications are satisfactory.

The specifications for plumbing provide for the installation of gas supply for the building and the specifications for heating and ventilating provide for electric motors and blowers for ventilating the building. These specifications have not the necessary approval of the Department of Water Supply, Gas and Electricity, but are satisfactory otherwise. The estimates of cost have been checked by this Bureau and are reasonable.

It is desirable that approval of these specifications and plans be given as soon as possible in order to permit the advertisement and award of the contract in time for the completion of the foundation work before freezing weather sets in.

I recommend the adoption of the attached resolution approving the amended form of contract and specifications, the plans and estimate of cost for general construction and approving the form of contract specifications, plans and estimates of cost for heating and ventilating work and plumbing work, subject to the approval of the specifications by the Department of Water Supply, Gas and Electricity.

Respectfully,

TILDEN ADAMSON,
Director.

The following resolution was offered:

Resolved, That the Board of Estimate and Apportionment, pursuant to its resolution of July 11, 1912, hereby approves the form of contract and specifications as amended, the plans and estimates of cost for the completion of the laboratory building and greenhouses for the Brooklyn Botanic Garden, Borough of Brooklyn, under the jurisdiction of the Department of Parks, Borough of Brooklyn, as follows:

General construction, estimated cost, one hundred and thirty-six thousand dollars ($136,000).

Heating and ventilating work, estimated cost, twenty thousand dollars ($20,000).

Plumbing work, estimated cost, fourteen thousand dollars ($14,000), *subject* to the approval of the specifications for Heating and Ventilating Work and Plumbing Work by the Department of Water Supply, Gas and Electricity.

—the cost to be charged as follows:

One half to the corporate stock fund entitled "C.D.P. 200-M, Department of Parks, Borough of Brooklyn, Improvement of Botanic Garden," and one half to the fund entitled "S. 566, Suspense Account, Contribution for Brooklyn Botanic Garden Improvement Fund"; provided that in the event that the aggregate sum of the lowest bids received for the three items is equal to or less than the aggregate sum of the three items herein approved (although the amount of the lowest bid for one or more items may exceed the amount approved for said item or items), then the awards for the three items, provided all are awarded, may be made without further approval by the Board of Estimate and Apportionment, and provided further, that in the event that the aggregate sum of the lowest bids received for the three items exceeds the aggregate sum of the three items herein approved, no award for any item shall be made and the amount of such estimated cost upon the bids so received may be reconsidered in its discretion by the Board of Estimate and Apportionment, or by any official designated by the Board, provided that any of the bids is within the amount authorized and available for said work.

Which was adopted by the following vote:

Affirmative.—The Mayor, the Comptroller, the Acting Presi-

dent of the Board of Aldermen, the Presidents of the Boroughs of Manhattan, Brooklyn and The Bronx, the Acting President of the Borough of Queens and the President of the Borough of Richmond—16. (*City Record* 43 : 7526. 5 October 1915.)

APPENDIX 10

BOARD OF ESTIMATE AND APPORTIONMENT

Resolution Approving form of Contract for Architects' and Engineers' Services for Completion of Botanic Garden Buildings. (*From Minutes of Meeting of November 5, 1915.*)

Department of Parks, Borough of Brooklyn—Approval of Contract for Architectural Services (Cal. No. 19)

The Secretary presented a communication, dated August 26, 1915, from the Commissioner of Parks, Borough of Brooklyn, requesting approval of form of contract for architectural services at an estimated cost of $7,500; in connection with the completion of laboratory building and greenhouses, Brooklyn Botanic Gardens; and the following report of the Bureau of Contract Supervision recommending approval thereof:

City of New York, Board of Estimate and Apportionment,
Municipal Building, Bureau of Contract Supervision,
October 25, 1915.

To the Board of Estimate and Apportionment:

Gentlemen: On August 30, 1915, you referred to the Bureau of Contract Supervision a communication, dated August 26, 1915, from the Park Commissioner, Borough of Brooklyn, requesting approval of the form of final contract for the services of Messrs. McKim, Mead and White, architects, for the completion of the Laboratory Building and greenhouses, Brooklyn Botanic Garden, Borough of Brooklyn. The architect's contract for preliminary drawings, specifications and estimates of cost of the building, allowing a fee of $2,800, or 1 per cent. of $280,000, the total estimated cost of the building, was approved by the Comptroller of July 22, 1913. On November 20, 1913, the Board of Estimate and Apportionment approved the architect's final contract for the completion of the first part of the building, the fee being fixed at 4 per cent. of the total cost of

the work plus an additional and cumulative compensation for reimbursement to the architects for the expense of employing an engineering specialist of 2½ per cent. of the total cost of the heating and ventilating work, plumbing, electrical and refrigerating work, power plants and apparatus, specially designed lighting fixtures, moveable and fixed furniture for which said specialist shall have been specifically employed, said architest's fees to aggregate not more than $2,500. On the same date the Board of Estimate and Apportionment approved the architect's final contract for the second part of the building, the architect's fees to aggregate not more than $1,200.

The final architect's contract now submitted for approval is similar to the final contracts previously approved, and provides for a fee of 4 per cent., with additional compensation of 2½ per cent. of the cost of heating and ventilating work, plumbing, electrical and refrigerating work and power apparatus. The estimated cost of the architect's contract is $7,500. The cost is to be divided and charged to funds as follows:

Five thousand seven hundred and eighty-nine dollars and thirty-one cents against "C.D.P. 200L, Department of Parks, Borough of Brooklyn and Queens, Construction and Equipment of a Laboratory Building and Greenhouses in the Botanic Garden and Arboretum." The appropriation of $100,000 for the fund was approved by resolutions and modifying resolutions of the Board of Estimate and Apportionment on June 3, 1910, July 17 and 27, 1911, and May 8, 1913, and by the Mayor on July 19, 1910, August 30, 1911, and June 17, 1913. On October 2, 1915, there remained an unencumbered balance of $5,789.31 in the fund.

Eight hundred and fifty-five dollars and thirty-five cents against "C.D.P. 200M, Department of Parks, Borough of Brooklyn, Improvement of Botanic Garden." The appropriation of $100,000 for this fund was approved by the Board of Estimate and Apportionment on June 18, 1915, and by the Mayor on July 6, 1915. The fund is unencumbered.

Eight hundred and fifty-five dollars and thirty-four cents against the account "S-566, Suspense Account, Contribution for Brooklyn Botanic Garden Improvement Fund." The amount of this fund is $100,000, contributed by Alfred T. White. It is also unencumbered.

The form of contract is one regularly used by the City for architects' services.

I recommend that the request be approved by the adoption of the attached resolution.

Respectfully,

TILDEN ADAMSON,
Director.

The following resolution was offered:

Resolved, That the Board of Estimate and Apportionment, pur-

suant to its resolution of July 11, 1912, hereby approves of the form of final contract and the estimate of cost, in the sum of seven thousand five hundred dollars ($7,500), for the services of McKim, Mead and White as Architects, for the preparation of complete plans and specifications and the supervision of the completion of the proposed Laboratory Building and Greenhouses in the Botanic Garden, Borough of Brooklyn, under the jurisdiction of the Department of Parks, Borough of Brooklyn, the compensation to be at the rate of four per cent. (4 per cent.) of the total cost of the work, plus an additional and cumulative compensation for the reimbursement to the aforesaid architects for the expense of employing an engineering specialist who shall be approved by the Commissioner of Parks, two and one half per cent. (2½ per cent.) of the total cost of the heating and ventilating work, plumbing, electrical and refrigerating work, power plants and power apparatus, the cost to be divided and charged against the following funds: five thousand seven hundred and eighty-nine dollars and thirty-one cents ($5,789.31), against "C.D.P. 200L, Department of Parks, Boroughs of Brooklyn and Queens, Construction and Equipment of a Laboratory Building and Greenhouses in the Botanic Garden and Arboretum"; eight hundred and fifty-five dollars and thirty-five cents ($855.35) against "C.D.P. 200-M, Department of Parks, Borough of Brooklyn, Improvement of Botanic Garden"; eight hundred and fifty-five dollars and thirty-four cents ($855.34) against the account "S. 566—Suspense Account, Contribution for Brooklyn Botanic Garden Improvement Fund."

Which was adopted by the following vote:

Affirmative.—The Mayor, the Comptroller, the President of the Board of Aldermen, the Presidents of the Boroughs of Manhattan, Brooklyn, The Bronx and Queens and the Acting President of the Borough of Richmond—10. (*City Record* 43: 8645–8646. 12 November, 1915.)

APPENDIX 11

BOARD OF ESTIMATE AND APPORTIONMENT

Resolution Passed December 12, 1902, in the Matter of Acquiring for the City of New York Title to the Land Comprising the South Addition to the Brooklyn Botanic Garden.*

(From Minutes of Meeting of December 12, 1902.)

Whereas, on July 22, 1902, the Board of Aldermen of the City of New York, by a two-thirds vote of all the members elected voting in favor thereof, passed the following resolutions:

Be it ordained by the Board of Aldermen of the City of New York as follows:—

"That, in pursuance of the provisions of section 442 of the Greater New York Charter, the following resolution of the Board of Estimate and Apportionment, adopted by that Board on the 20 day of June, 1902, be and the same hereby is approved, viz:

"Resolved, That the Board of Estimate and Apportionment of the City of New York, in pursuance of the provisions of section 442 of the Greater New York Charter, deeming it for the public interest to alter the map or plan of the City of New York by locating and laying out an addition to Prospect Park, and closing and discontinuing certain streets for the construction of an approach to the Willink entrance to Prospect Park, in the Twenty-ninth Ward, Borough of Brooklyn, City of New York, does hereby favor and approve of the same so as to locate and lay out the said approach as follows:

"1. Locating and laying out an addition to Prospect Park.

"Beginning at the intersection of Flatbush Avenue and Malbone Street, as the same are laid down on the map of the City:

"1. Thence northerly along the eastern line of Flatbush Avenue for 477.28 feet, more or less, to the southern line of East Side Lands;

*Information as to the acquisition of title by the City of other land comprised in the garden was given in the Garden Record 2: 98–100. July, 1913.

"2. Thence easterly along the southeasterly line of East Side Lands for 763.55 feet, more or less, to the western line of Washington Avenue;

"3. Thence southerly for 1,050.79 feet, more or less, along the western line of Washington Avenue to the northern line of Malbone Street.

"4. Thence westerly along the northern line of Malbone Street for 341.82 feet to the point of beginning.

"11. Closing and discontinuing of Washington Place and a street north of Washington Place, as the same are laid down, between Washington Avenue and Flatbush Avenue."

Resolved that the Board of Estimate and Apportionment, in pursuance of section 970 of Chapter 455 of the Laws of 1901, deem it for the public interest that title to the lands and premises required for the locating and laying out of an addition to Prospect Park, in the Borough of Brooklyn, in the City of New York, should be acquired by the City of New York, the said land and premises being bounded and described as follows:

"Parcel A.

"Beginning at the intersection of the easterly line of Flatbush Avenue with the northerly line of Malbone Street, as the same are laid down on the map of the City, running thence northerly along the easterly line of Flatbush Avenue four hundred seventy-seven and twenty-eight one hundredths (477.28) feet, more or less, to the line of the east side lands; thence easterly along the east side lands seven hundred sixty-three and fifty-five one hundredths (763.55) feet, more or less, to the westerly line of Washington Avenue, thence southerly along the westerly line of Washington Avenue five hundred sixty-nine and thirty-six one hundredths (569.36) feet, more or less, to the northwesterly line of the Brooklyn and Brighton Beach Railroad, thence southerly along the northwesterly line of the Brooklyn and Brighton Beach Railroad five hundred forty-five and thirty-six one hundredths (546.36) feet, more or less, to the northerly line of Malbone Street; and thence westerly along the northerly line of Malbone Street one hundred and ten (110) feet, more or less, to the point of beginning.

"Parcel B.

"Beginning at the intersection of the northerly line of Malbone Street with the westerly line of Washington Avenue, as the same are laid down on the map of the City; running thence westerly along the northerly line of Malbone Street one hundred sixty-three and eighty-three one hundredths (163.83) feet, more or less to the southeasterly line of the Brooklyn and Brighton Beach Railroad; thence northerly along the southeasterly line of the Brooklyn and Brighton Beach Railroad three hundred eighty-one and sixteen one hundredths (381.16) feet, more or less, to the westerly line of Washington Avenue; and thence southerly along the westerly line of Washington Avenue three hundred ten and fifty-nine one hundredths (310.59) feet, more or less, to the point of beginning."

Resolved, That the Board of Estimate and Apportionment hereby requests the Corporation Counsel to take the necessary proceedings in the name of the City of New York to acquire title, whenever the same has not been heretofore acquired, to the lands, tenements and hereditaments, for the purpose of locating and laying out said addition to Prospect Park.

Resolved, That the Board of Estimate and Apportionment, in pursuance of the provisions of section 980 of chapter 466 of the laws of 1901, hereby directs that the entire cost of the above named proceeding be borne and paid by the City of New York.

A true copy of a resolution adopted by the Board of Estimate and Apportionment, December 12, 1902.

(Signed) JOSEPH HAAG,
Secretary.

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PUBLICATIONS

OF THE

BROOKLYN BOTANIC GARDEN

RECORD. Established January, 1912. An administrative periodical, issued quarterly. Contains, among other things, the annual report of the director and heads of departments, special reports, announcements of courses of instruction, miscellaneous papers, and notes concerning Garden progress and events. Free to members of the Garden and of the Department of Botany of the Institute. To others one dollar a year; 25 cents a copy.

CONTRIBUTIONS. Papers originally published in botanical or other periodicals, reissued as "separates," without change of paging, and numbered consecutively. This series includes occasional papers, as well as those embodying the results of research done at the Garden, or by members of its staff or students. Twenty-five numbers constitute one volume. Price 25 cents each, $5.00 a volume.

1. *The educational work of botanic gardens.* 13 pages. 1911.

2. *The purpose of an introductory course in botany.* 8 pages. 1911.

3. *Cryptomeric inheritance in Onagra.* 11 pages, figs. 2; plates 2. 1911.

4. *On the origin and present distribution of the pine-barrens of New Jersey.* 15 pages, figs. 2. 1912.

5. *Ingrowing sprouts of Solanum tuberosum.* 10 pages, figs. 6; plate 1. 1912.

6. *Intermingling of perennial sporophytic and gametophytic generations in Puccinia, P. obtegens and Uromyces Glycyrrhizae.* 15 pages, 1 plate. 1913.

7. *Studies of teratological phenomena in their relation to evolution and the problems of heredity. 1. A study of certain floral abnormalities in Nicotiana, etc.* 14 pages, figs. 4. 1914.

8. *Some observations on the formation of the capillitium and the development of Physarella mirabilis Peck and Stemonitis fusca Roth.* 15 pages, 2 plates. 1914.

9. *The growth-forms of the flora of New York and vicinity.* 9 pages. 1915.

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1. *The Brooklyn Botanic Garden.* Price, 5 cents.

LEAFLETS. Established April 10, 1913, and published weekly or biweekly during April, May, June, September, and October. The purpose of the Leaflets is primarily to give announcements concerning flowering and other plant activities to be seen in the Garden near the date of issue, and to give popular, elementary information about plant life for teachers and others. Current numbers free to all who wish them. Back series complete, 50 cts. each; back numbers, 5 cts. each.

SEED LIST. Issued in December of each year.

AMERICAN JOURNAL OF BOTANY. Established, January, 1914. Published, in cooperation with the BOTANICAL SOCIETY OF AMERICA, monthly, except during August and September. Subscription rates: to members of the Botanical Society of America, $3.00 a year; to all others $4.00 a year.

BROOKLYN BOTANIC GARDEN

RECORD

VOL. V JULY, 1916 No. 3

EDITED BY

C. STUART GAGER

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DR EDGAR W. OLIVE, *Curator of Public Instruction*

DR. O. E. WHITE, *Curator of Plant Breeding*

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_____, *Garden Aid*

MR. HERMAN KOLSH, *Foreman*

McKIM, MEAD & WHITE, *Architects*

OLMSTED BROS., *Landscape Architects*

FIG. 7. Rock Garden, May 19, 1916. View facing northwest. Planting only just begun.

THE BROOKLYN INSTITUTE OF ARTS AND SCIENCES

BROOKLYN BOTANIC GARDEN RECORD

VOL. V July, 1916 No. 3

LAYING THE CORNER STONE

On Thursday, April 20, 1916, at 4:30 p. m. the corner stone of the laboratory building was laid with simple formalities. The president of The Brooklyn Institute of Arts and Sciences, Mr. A. Augustus Healy, presided, the stone was laid by the chairman of the Governing Committee of the Garden, Mr. Alfred T. White, and brief remarks were made by the director of the Garden. Members of the board of trustees and executive officers of the Institute, officers of the Garden Teachers' Association of the Brooklyn Botanic Garden, and of the Boys' Club and the Girls' Club, and members of the Garden staff were present. The remarks of the three speakers, and a list of objects deposited in the hermetically sealed copper box, placed within the stone, follow.

Remarks of President Healy

We are met this afternoon to witness the simple ceremony of laying the corner stone of this building, now in course of erection, and which is to be devoted to instruction in Botany. We may, in our thought, enlarge the significance of the act about to be performed and consider it as the laying of the corner stone of the group of related buildings within which all of the indoor work of the Brooklyn Botanic Garden is to be done, whether it be of scientific instruction, of original research, or the growth and propagation of plants. In this aspect, certainly, the event is worthy of celebration, for with a proper equipment of suitable

and convenient buildings, our Botanic Garden, which has already displayed the vigor and strength of youth, will be able vastly to enlarge its usefulness and in some adequate measure to impart to our people, young and old, the knowledge of trees and plants, fruits and flowers, in their myriad forms of beauty, which is nowhere else in this great borough to be obtained. Here the infinite book of nature will be opened to our citizens so that they can learn something of the fascinating and wonderful contents which it has to reveal.

The land upon which this Botanic Garden is located was set apart for the purpose, by enactment of the legislature, nearly twenty years ago, but it was not until 1910 that the Garden was actually established. It is but just to say, and it ought to be said upon this occasion, that more than to any one else and more than to all others combined we owe the Botanic Garden to Alfred T. White, who is and who has been from the beginning the chairman of the Committee on Botanic Garden. He has realized and felt more deeply than any of us the great advantage to the community of such an institution as this. It is to his initiative, to his wise and intelligent direction of its affairs, to his frequent large donations of money—at present sharing equally with the city the cost of the buildings now under construction—that we owe our Botanic Garden as we have it to-day in successful operation with its possibilities of far greater development lying immediately before us. How Mr. White has been able to do all this, while at the same time giving continuously of himself and his means with great liberality to many other institutions and causes of charity or philanthropy, it is difficult to understand. But the Botanic Garden is an accomplished fact—thanks to him—and here it will remain, a blessing to us and to generations yet unborn.

One thing more. The success which the Botanic Garden has already attained has been due in very large measure to the ability, the zeal, and the high order of the service of Dr. C. Stuart Gager, its efficient director, and his excellent assistants. The organization and direction of the scientific work of the Garden has from its inception been in the hands of Dr. Gager, and it is fortunate for the public that work of this character is able to inspire in men of science like him a noble enthusiasm and an in-

intellectual activity which enables us to obtain from them, as a labor of love, a kind of service of far greater value than money can buy.

We shall now proceed to the ceremony of laying the corner stone which has been generously donated by the contractors of the building, Messrs. Frymier and Hanna, whose interest in the building, as thus evidenced, goes beyond mere business considerations and has regard to the important purposes to which it is to be dedicated. Our thanks are due to them for the generous thought and appreciation of the work of the Garden which has inspired this gift.

We have invited Mr. Alfred T. White, chairman of the Botanic Garden Governing Committee of the Brooklyn Institute of Arts and Sciences, to lay the corner stone of the building. No one else so fittingly as he, for reasons to which I have referred, could perform this solemn act.

Remarks of Mr. Alfred T. White

The land occupied by the Brooklyn Botanic Garden was for the most part acquired by the old city of Brooklyn at the same time that the first lands were acquired for Prospect Park, more than fifty years ago,* but the ground remained unvisited by the public until leased to the Brooklyn Institute of Arts and Sciences December 28, 1909, for the purpose of establishing the Brooklyn Botanic Garden. In the minds of those most interested in furthering this project the prominent purposes were to bring into public use and enjoyment a long neglected and valuable piece of the city's property by creating a botanic garden which should be at once beautiful and instructive, attractive to the general public and especially educational to childern, and stimulating a love of nature in all.

Today we are laying the corner stone of the Instruction Building, in which the indoor classes will be taught by lectures and demonstrations, supplemented by study in the plant houses and in the open garden. The southerly section of this building, together with the palmhouse and one of the planthouses, was com-

* Construction work on Prospect Park was begun on July 1, 1866, and the Park was first thrown open to the public in October, 1867.

pleted in December, 1913. The architects of the building are Messrs. McKim, Mead & White. The general contractors for the completion of this building and the remainder of the planthouses are Frymier & Hanna. The entire cost of the completed instruction building and the four planthouses, palmhouse and one propagating house, including the work already done and the work remaining to complete, will not be very far from $270,000. From the demands already made upon the staff of instructors by the teachers and children, especially those of the public schools of Brooklyn, it seems probable that the entire building will be occupied and taxed to the limit of its capacity as soon as completed. That this crowning success may be confidently expected is due in largest measure to the untiring efforts of Dr. C. Stuart Gager, the director of the Garden since its beginning, and to the exceptionally efficient staff which he has gathered around him, among whom I should like to mention especially Mr. Norman Taylor, curator of plants, Dr. Edgar W. Olive, curator of public instruction, Dr. O. E. White, curator of plant breeding, Miss Ellen Eddy Shaw, curator of elementary instruction, Miss Bertha M. Eves, secretary, and Dr. Laura E. Watson Benedict, librarian.

Remarks of Director Gager

The idea of the Brooklyn Botanic Garden was first proposed by the late director of the Brooklyn Institute of Arts and Sciences, Professor Franklin W. Hooper, who was instrumental in securing the passage of the necessary law by the State Legislature, at Albany, in 1897, authorizing the city, under the direction of its park commissioner, to establish the Garden.*

The suggestion that the Garden should be administered by the Institute, as an integral part of its organization, was made nearly ten years later by the present chairman of the Governing Committee of the Garden, who was not aware of the legislation already enacted.

Having been the parent of the Garden, as now organized, Mr. White has assumed all the responsibility and cares of a

* The bill was introduced into the Legislature by the Hon. George W. Brush, M.D., member of the board of trustees of the Brooklyn Institute of Arts and Sciences.

mother, as well as the joys of a father. As President Healy has just said, whatever of progress and successful accomplishment the Garden may have made, during the six brief years of its childhood, is due in largest measure to the generous support of Mr. White and his two sisters; and to his personal thought and attention, and sympathetic interest in every phase of its work; but for their timely and generous gift we should not be able to lay the corner stone of this sorely needed building in the year 1916, nor for an indefinite period thereafter.

The guiding ideal of the Brooklyn Botanic Garden is tersely expressed in the sentiment placed upon the small gate signs at each of our entrances: "For the advancement of botany and the service of the city."

From the beginning until now an earnest endeavor has been made to promote the activities of the Garden in both of these directions, but with a special care to making the institution as useful as possible to its local constituency.

A botanic garden is of value to its city by the mere fact of being a garden—a spot of beauty, and an additional bit of nature in the midst of the artificial and the less attractive aspects of city life. By diffusing popular education, by cooperating with the public and private schools, by cooperating with the Department of Parks in the care of trees and shrubs, in offering formal instruction in pure and applied science, in advancing our knowledge and love of plants, a botanic garden may not only make itself useful, but may supply a need which not only ought to be felt by every city, but which every body of intelligent and progressive citizens will feel; for a botanic garden ministers to fundamental needs which cannot be met by any other kind of an institution.

But, even though supported in part by public taxation, such an institution ought not to be local in its interests nor its influence. A botanic garden like this ought not only to supply local needs in ways suggested above, but ought also to be an important factor in the botanical world as a whole. In fact it ought to be part of the pride and glory of the city that its botanic garden commands a favorable recognition that is world wide.

What are Kew Gardens in London, the Jardin des Plantes in

Paris, the Royal Botanic Gardens in Berlin, the Imperial Botanic Gardens in Tokyo, the Missouri Botanical Garden at St. Louis, and our sister institution in the Bronx, to their respective cities *because* of their world wide fame as centers for the advancement of science and learning!

It is fitting, then, to keep in mind, on this most delightful occasion, the whole purpose of the Garden. With adequate support, in sympathy and in funds, this botanic garden may not only become a source of pleasure and recreation and instruction to the citizens of Brooklyn, but should, in due time, take its place as one of the foremost scientific institutions of the world. To the accomplishment of this entire purpose may these grounds, and the Garden staff, and this beautiful building-to-be be devoted.

List of Objects Deposited in the Corner Stone of the Laboratory Building, April 20, 1916

Envelope No.

1. Copies of remarks made at the corner-stone exercises by the president of the Brooklyn Institute of Arts and Sciences, Mr. A. Augustus Healy, presiding; the chairman of the Governing Committee of the Botanic Garden, Mr. Alfred T. White; and the director of the Botanic Garden, Dr. C. Stuart Gager.
2. Brooklyn Botanic Garden Record—complete set from Vol. I, No. 1, to Vol. V, No. 2, including the first to fifth annual reports of the Botanic Garden (1911–1915).
3. Brooklyn Botanic Garden Leaflets—various issues.
4. Brooklyn Botanic Garden Contributions—various numbers; certificates; diplomas; miscellaneous printed matter.
5. Invitations to membership in the Garden; reply card; invitation to spring opening, 1915.
6. Illustrated booklet of the Garden; circular to Parents and Friends of Children; *Torreya* for January, 1916.
7. *American Journal of Botany,* Vol. I, No. 1; Prospectus, January, 1914; circular, January, 1916; agreement of 1914 between the Botanical Society of America and the Brooklyn Botanic Garden concerning the *Journal of Botany.*
8. Memoranda of conversations concerning the movement to establish a Brooklyn Botanic Garden; photographs showing excavation for the building, and children's gardens on the site of the building, 1915; souvenir postcards of the Japanese Garden; blank forms in use in connection with the children's work; Brooklyn Botanic Garden Boys' Club, Officers, 1916; Brooklyn Botanic Garden Girls' Club, Officers, 1916; membership buttons and exhibitor's

button issued to children; Garden Teachers' Association of the Brooklyn Botanic Garden, officers and members, 1916; booklet of information; diagram showing the location of the Garden in the city; card of invitation to the first tree planting; book plates; Botanic Garden letter-heads; autograph of Mr. Alfred T. White; copy of monthly report of the director of the Garden to the trustees of the Brooklyn Institute of Arts and Sciences for March, 1916; folder giving itinerary for trip through the Garden at the reception to the Japan Society, May 21, 1913; miscellaneous printed matter.

9. Samples of numbered blank forms in use from the beginning of the Garden to 1916.
10. Samples of plant labels in use, 1916.
11. One copy of the Twenty-fifth Year Book of the Brooklyn Institute of Arts and Sciences, 1912–1913 (the last issue to date).
12. Copy of the *Brooklyn Daily Eagle* of April 20, 1916; copy of the *Standard-Union,* April 20, 1916.

REPORT ON A TRIP TO STUDY AND COLLECT RUSTS AND OTHER PARASITIC FUNGI OF PORTO RICO

The writer sailed on February 19, 1916, on the New York and Porto Rico liner *Carolina,* in company with Professor H. H. Whetzel, of the college of agriculture of Cornell University, to spend two months or more in collecting and studying the fungi of Porto Rico. I am indebted to three sources for funds for this purpose; and I wish here to record my sincere thanks for such assistance, in particular, to Dr. N. L. Britton, director of the New York Botanical Garden, to the committee in charge of grants of the New York Academy of Sciences, as well as to the authorities of the Brooklyn Botanic Garden.

Landing on the afternoon of February 23 at San Juan, we spent two days in presenting credentials to certain influential men and in making a general survey of the situation relative to the prevalence of fungous diseases in the vicinity. On the 25th, we went on by train to Barceloneta, on the north shore, in the heart of the grape-fruit and pineapple plantations of the Island. Many Americans have settled in this district, from San Juan to Arecibo, and have gone largely into the business of fruit growing. We

found them particularly concerned over the increasing prevalence of the "lemon scab" disease, which they regard as a serious menace to the grape-fruit industry. Spraying with Bordeaux mixture helps to control the disease, but this method presents many difficulties. The water-haul in some instances is very long, and extremely slow with ox teams, so that the time consumed and expense involved makes adequate spraying prohibitive. During the dry season, when cisterns run low, it is in fact next to impossible to secure sufficient water for this purpose. Professor Whetzel therefore suggested a try-out with the dry dusting devices which have proved so economical of time and otherwise successful in the control of apple diseases in New York State.* Arrangements were concluded whereby Mr. Langley, our host at Barceloneta, should secure a hand dusting machine and should cooperate in an experiment to try the efficiency of dry sulphur and other materials in the control of their fungous diseases. This was later, on our return in April, tried out on a small scale, on both nursery stock and large grape-fruit trees, and some preliminary reports from Mr. Langley seem to indicate the complete success of the experiment.

On February 26, we went on further by train to Mayagüez, on the southwest corner of the Island, where we proposed making headquarters for some weeks. Here are located the Federal Agricultural Experiment Station and the Agricultural College. To members of the staff of both these institutions, we are under great obligations for many courtesies; everyone, in fact, with whom we came in contact took much interest in our work and contributed in various ways to its success. In particular, to Dean Garwood and Profesor Hunn, of the College, as well as to Director May, Mr. Brandes, and others of the Experiment Station, I wish to express our hearty appreciation of many favors.

We found the general environment at Mayagüez extremely favorable for our work; our living arrangements with a small group of college and high-school teachers being more than merely satisfactory, and the climatic and other conditions being almost ideal for the growth of parasitic fungi. We found in fact over

* See Cornell Univ. Agr. Exp. Sta. Bulls. 340, 354, 369; Circ. 32, Extension Bull. 1.

nearly the whole Island conditions prevailing which favored the development of rusts and other parasitic fungi: heavy dews which completely covered leaf surfaces with a solid film of moisture, cool nights and hot days. Fortunately for us, we largely missed the rainy season on this part of the Island, so that during the month and more which we spent in and about Mayagüez, we were deterred only a few times by rain.

Making Mayagüez headquarters, we made rich collections in the vicinity and surrounding districts, including the mountainous region around Maricao, north to Anasco, and south to the southeast corner of the Island, around Boqueron, Guanica, Yauco and San German. Returning to the north shore on April 5, we spent several days again in Barceloneta, testing the effects of sulphur and other dust mixtures, as mentioned above, on certain plant diseases, and collecting in the vicinity. We then made headquarters for the remainder of our stay of two weeks and a half in an American boarding house at Martin Peña, a suburb of San Juan. Here we had at hand the facilities so freely tendered us at the insular Exeriment Station at Rio Piedras, and to Director Tower and Mr. J. A. Stevenson, plant pathologist of the station, we are under especial obligations. Our trips from this locality included excursions to El Yunque, the high mountain on the eastern end of the island, to Naguabo and the near-by mountains, to Manati and other points in the grape-fruit district, and, finally a hasty trip to points near the middle of the Island and to Coamo on the south slope.

It will thus be seen that in the comparatively short time at our disposal, we almost circumnavigated the island which is, roughly, about 100 miles long by about 40 miles wide, ascending from the coastal plain into the interior at about five points. We were thus able fully to appreciate the wonderful diversity in vegetation, due perhaps largely to the great differences in rainfall, which ranges from 123 inches annually near El Yunque at the east end, to practically desert conditions at many points on the south and southwest. This remarkable diversity of host plants was naturally accompanied by great diversity of fungous parasites. While it is true that quite a goodly number of parasitic fungi were found to be very generally distributed over the island, a

much larger number, on the other hand, seemed to be localized to a remarkable degree. In order to find a second time a certain species of fungus, we might have to return, for instance, to one spot on the island.

During practically the whole of our sojourn, we had the services of a young graduate of the Agricultural College at Mayagüez, Mr. F. Oliver, who rendered us indispensable service as interpreter, guide, and general assistant. Both in Mayagüez and in Martin Peña, we fitted up a laboratory for pressing our specimens and for preliminary study with the compound microscope. We examined critically with the microscope nearly every collection, only those in good condition being retained. Of the total of 700 numbers of parasitic fungi collected altogether, about 500 were rust fungi. Professor Arthur, the eminent rust specialist, who came to New York for a preliminary examination of our collections, has pronounced several of these undoubtedly new to science. Of the 200 or so other sorts of fungi collected, the great majority are members of the Ascomycetes, or sac-fungi, a group in which Professor Whetzel takes special interest. We also brought back many bottles of material designed for further microscopic examination, which will require prolonged studies finally to solve the various scientific problems connected with them.

Such a trip as this has proved exceedingly stimulating. It furnished for us both our first sight of the tropics. Barring a couple of cases of very disagreeable poisoning by a plant, *Comocladia,* which belongs to the same family to which our poison ivy belongs, and some digestive troubles induced, in all probability, by bad drinking water or poor food, we kept in splendid physical condition for the strenuous work. Again and again we proved the wisdom of scientific men working thus in groups, for besides thus being able to cover much more ground, we found that our knowledge of forms often needed to be supplemented by points which the other member of the party had to offer. Our work would have been still further simplified if a specialist in flowering plants had been along.

After our return to New York on the steamer *Brazos,* on May 1, we spent ten days or so at the herbarium of the New York

FIG. 8. Laboratory building, May 19, 1916. View facing northwest from Washington Avenue.

Botanical Garden, numbering and naming our collections. In the difficult work of naming the host plants we depended largely on the wide knowledge of West Indian plants possessed by Mr. Percy Wilson, of the New York Botanical Garden. Director Britton and Dr. Small, also of the staff of the New York Botanical Garden, assisted us materially in such determinations. Our grass hosts were sent for determination to Professor A. S. Hitchcock, of the U. S. Department of Agriculture, the Smuts to Dr. Clinton of the Connecticut Agricultural Experiment Station, and the Rusts to Professor Arthur, of Purdue University. After the final determination of fungi and host plants, it would be desirable, if possible, to prepare sets for distribution, as well as for incorporation in our own and other cryptogamic herbaria.

Time only will enable us thoroughly to appreciate the scientific value of such a trip, aside from its general stimulating influence. It may be here pointed out, however, that in addition to discovering a number of forms new to science, we have by germination studies made clearer the life histories of quite a number of others, particularly among the rust fungi. It is planned to publish some of these results in the near future. Various other important biological problems have been given impetus, as, for example, the economic problem as to whether dusting with finely powdered fungicides and insecticides will be more efficient and more economical than spraying, in the control of certain plant diseases.

EDGAR W. OLIVE,
Curator of Public Instruction.

NOTES

Spring Inspection.—The second annual spring inspection of the Garden by trustees, members, and invited guests was held on Tuesday, May 9, from 3:30 until 5 o'clock. Guests assembled at the laboratory building and passed in groups of thirty or forty through the plant houses, thence viewing, in order, the new sections of the building and plant houses under construction, the experimental plot and new site of the children's gardens, the

systematic section and the newly constructed but only partially planted rock garden. North of the rock garden a white oak tree was planted by the chairman of the Governing Committee of the Garden in the "white oak circle." Thence the guests passed to the southern end of the esplanade (in lawn for the first spring, this year), and past the 36 tulip beds, containing 6,000 bulbs of 30 varieties of tulips, and 8 of narcissus. One half of these bulbs were from Holland, the other half were grown at Bellingham, state of Washington, by the United States Department of Agriculture. After passing through the wild flower garden, a pause was made at the plateau to the north where a black oak (*Quercus velutina*) was planted by the president of the Brooklyn Institute of Arts and Sciences. The newly laid out lilac triangle, containing 135 species and varieties of lilacs, was then inspected, and finally the Japanese garden, where new planting, new paths, and other improvements were made this spring. The flowering cherries were in full bloom, and the day was clear, though windy. During the inspection of the grounds, boy scouts in uniform preceded the guests with the city flag.

Research Appointments.—On April 3, 1916, the governing committee of the Garden authorized the appointment of Dr. Ralph Curtis Benedict as resident investigator. Dr. Benedict is at present making a study of the varieties of the Boston fern (*Nephrolepis*) from the standpoint of experimental evolution and plant breeding. This study promises to yield information of both scientific and economic importance concerning heredity and variation in general, and in the Boston fern in particular. As a result of the work our collections of living plants has been enriched by over 75 varieties of *Nephrolepis,* forming one of the largest collections of this fern ever assembled. It is hoped that this may prove to be only the first of a series of similar appointments.

Dr. W. H. Rankin, who, on November 24, 1915, was appointed research fellow for the purpose of investigating the diseases of trees and shrubs in the Garden and in Prospect Park during the summers of 1916 and 1917, has been obliged to resign his appointment on account of a change in his duties as assistant pro-

fessor in the New York State College of Agriculture, at Cornell University.

Prof. George M. Reed, of the University of Missouri, who was appointed in place of Prof. Rankin, entered upon his duties on June 15. Several serious tree diseases have already been found to have gained considerable headway in both the Garden and the Park.

Gift of Specimens.—On Tuesday, February 1, Dr. E. B. Southwick, entomologist of Central Park for over thirty years, retired from office. Dr. Southwick has been an inveterate collector of specimens, botanical as well as entomological, and having known the director of the Garden for over ten years, he most generously offered to present to the Garden his entire botanical collections. They were transferred to Brooklyn during the last three days of January and are now stored, partly in our building and partly (through the courtesy of Director Fox), in the unfinished section of the Museum building. The collections include specimens showing the structure of wood, insect and fungous ravages of trees and shrubs, specimens of seeds having commercial use, a collection of drug plants, and a herbarium estimated to comprise about 30,000 specimens. This is the largest gift of scientific material that the Garden has received since the gift of the Annie Morrill Smith library and herbarium of mosses.

Children's Building.—Plans and specifications for the Children's Building, to be located on the children's garden plot, were transmitted to the Park Commissioner by the architects on March 7, and approved by the Board of Estimate, with authorization of $6.550 of corporate stock, on April 7. The bids were opened on June 3, and the contract was awarded to Finnan and Lee, the lowest bidders. The amount of the bid was $5,220.

Children's Gardens.—On Saturday, May 13, the children's gardens were opened for the first time on their new site at the southern end of the grounds, along the Brighton Beach cut. The children took possession of the plot after marching from the laboratory building behind the city flag. One hundred and sixty-eight individual beds, each 8 × 10 feet, have been assigned for

the spring crops, and, in addition to these, twenty children are cultivating two large community lots. In addition to the regular class work, there are 15 older boys who are raising special crops, such as corn, tomatoes, and salad plants, for special study of different varieties of a garden vegetable. This work, if satisfactorily done, leads to a silver Botanic Garden pin.

The Brooklyn Botanic Garden Boys' Club was organized April 15. One hundred and twenty-five boys were enrolled as charter members. All the boys had taken one or more courses at the Garden. The plan for this club does not encourage frequent meetings; but rather is one to interest the boys in the work so that as years go on a large body of Brooklyn youths shall be intelligent about the Botanic Garden of their city. The director of the Garden was chosen honorary president. The chief officers were elected from a group of lads who are working for their silver buttons; the minor officers were chosen from boys who have secured or who are working for bronze buttons—all boys wearing the celluloid buttons of the Garden have voting privileges.

These buttons represent different stages in the work each boy is doing. The celluloid button is given to every boy who works at all with us; that is, as soon as a boy joins a class he receives a button. The bronze button is won after three courses are covered, while the silver button is the result of having accomplished a special piece of work which shall extend over at least six months of time. Several boys are now ready for their silver buttons, having made a rather comprehensive study of common trees, shrubs, and weeds. The club meets four times a year and is purely to advance the interest in the boys' work at the Brooklyn Botanic Garden.

The Brooklyn Botanic Garden Girls' Club, similar in object to the Boys' Club, was formed April 22. There were one hundred girls in the first enrollment. These clubs are both under the council of the department of elementary education of the Garden because, although many of the boys and girls are now high-school students, they start work at the Garden during their elementary school life.

A small group of girls is meeting weekly for silver button work. These girls are working on the life history of garden plants, and each girl is writing a book which takes up, chapter by chapter, the life story of a plant. This work is continuing into the outdoor summer garden where the soil, the planting of seeds, and plant friends and foes will enter into the study.

The chief officers of the Girls' Club were chosen this year by the councillors, and represent pupils from public schools 9, 152, 148, 36, and 98. The other officers were chosen by the club members.

Experiment with Holland Bulbs.—On May 15, Mr. Peter Bisset, acting agricultural explorer in charge, division of Foreign Seed and Plant Introduction, of the Bureau of Plant Industry, U. S. Department of Agriculture, called at the Garden to inspect the results of a cooperative experiment with tulips and narcissus, initiated last year between the Garden and the Department of Agriculture. About 3,000 bulbs of different varieties of early and late May flowering and of Darwin tulips, grown at Bellingham, state of Washington, were planted in one half of each of 36 beds, and the same number of bulbs of the same variety in the other half of the bed, in order that the plants might develop under as nearly identical conditions as possible. The tulips presented a beautiful sight when in flower throughout practically the entire month of May. A full report on the results will be reserved until the termination of the tests, which may be repeated in 1916–17.

Penny Packets of Seeds.—The Department of Public Instruction of the Botanic Garden has distributed approximately 111,000 penny packets of seeds to children this spring. This is an increase of about 25,000 over the number distributed last year, and an increase of over 86,000 over the number distributed two years ago when this distribution was inaugurated.

On Saturday, May 13, the Art Alumni Association of Pratt Institute met in the Japanese garden for the purpose of sketching. About twenty were present.

The construction of the rock garden, anticipation of which was mentioned in the annual report of the Garden for 1915, was be-

gun on Monday, April 10, and the rock work completed on Saturday, May 6. The contractor for the rock work, executed under the supervision of our head gardener, Mr. Free, was Mr. Thomas F. Guidera. Preliminary planting was done during the first two weeks of May.

On Tuesday afternoon, March 7, the curator of elementary instruction, Miss Shaw, spoke at the School of Horticulture for Women, Ambler, Pa., on the subject of magazine writing in the field of horticulture.

The *Florists' Exchange* for May 6, 1916 (p. 1140), contained a very appreciative article entitled "Brooklyn Botanic Garden: Notable Developments." Special mention was made of the spring planting for 1916, of the Japanese garden, and of the new rock garden, as well as of the wild flowers in bloom in the Garden in early May.

Seven boys who have received training at the Garden in the care of plants and lawns, have been placed in positions for the present summer. More requests for boys adequately prepared for such work have been received at the Garden than could be supplied. The preparation of boys for such work is one of the numerous opportunities offered to the young people of Brooklyn by our department of public instruction.

The National Educators Conservation Society, with headquarters in the Barclay Building, 299 Broadway, was organized on January 15, 1916, at the Hotel Belmont, New York. The following "creed" was adopted: "Our American Institutions are man-made; our natural resources are God-given; the perpetuation of the former depends upon the conservation of the latter." The stated object of the society is: "To promote the active protection and increase of wild life and forests through the professional educators of America." The originator and chief promoter of this organization is Mr. Nomer Gray, who was elected secretary at the first meeting. Prof. Charles L. Bristol, of New York University, was elected president, Dr. William T. Hornaday, director of the New York Zoological Park, chief counselor, and the director of the Brooklyn Botanic Garden one of twelve directors.

The village improvement society of Woodstock, Vt., has established at that place a botanical garden in the center of the village. The population of Woodstock is only about 1,700. One of the purposes of the garden is to call attention to the value of the native trees, shrubs, and herbs for decorative and other purposes. This is a most commendable movement. The establishment of botanic gardens for the purpose of fostering a knowledge and love of native plants, and as an adjunct to the nature study and botanical instruction in the public schools, should become general throughout the United States.

The Mothers' Club of P. S. 134 held a meeting at the Garden on May 10, visiting the conservatories and plantations.

The Brooklyn Art Guild spent the mornings of May 16 and 25, and June 1 sketching in the Japanese garden.

On Saturday, May 27, the New York Section of the National Nature Study Association met at the Garden at 10:30 a. m. for an outdoor lesson on common trees, conducted by Dr. Gundersen.

The *Gardeners' Chronicle of America,* for May, 1916, contains a reprint of the Brooklyn Botanic Garden *Leaflet,* Series III, No. 3, on "Plants for Hanging Baskets," by Mr. Montague Free.

About seventy-five delegates to the Biennial Convention of the General Federation of Women's Clubs (in session in New York City, May 24–June 1, 1916) were the guests of the Brooklyn Museum and the Botanic Garden on the afternoon of June 1.

On May 26 Miss Lula Conover was appointed assistant secretary of the Garden, beginning on June 1, in place of Miss Elizabeth Seaman, resigned. Miss Conover was in charge of the commercial department of the Albemarle Normal and Industrial Institute, Albemarle, N. C., from 1913 to 1915, acting also as secretary and treasurer. During 1915–16 she was principal of the school. Previous to this Miss Conover was for five years office assistant to the state engineer, Salem, Oregon.

On April 28 the Mothers' Club of P. S. 41 presented the Garden with $5.00 for the Children's Work of the Garden. This

is the first gift of money received for this work. Two weeks later (May 26) the Parents' Club of Emmanuel House also contributed $5.00 for the same purpose. Such gifts are doubly valued by the Botanic Garden because of the interest and confidence in our work, of which they are substantial evidence.

On Saturday, April 29, the first section of the new zoological building, in Prospect Park, was opened with formal exercises. The funds for the ercetion of this building were raised by private subscription. Brief addresses were made by the Park Commissioner, Hon. Raymond V. Ingersoll, Hon. Geo. V. Brower (park commissioner when the first animal was acquired for a "zoo" in Prospect Park in 1885), Mr. Herbert F. Gunnison, of the Brooklyn Eagle, Mrs. John J. Schoonhoven, representing women's clubs, and the director of the Brooklyn Botanic Garden. Mr. Albert F. Pratt, president of the Brooklyn Zoological Association, presided.

At a meeting of the Woman's Farm and Garden Association (formerly the Women's Horticultural and Agricultural Association) on June 8, 1916, Miss Ellen Eddy Shaw, of the Garden staff was appointed chairman of a committee on children's gardens. At the annual meeting in Boston, May 18, 1916, Miss Shaw was also elected a member of the council. Miss Cross, also of the Garden staff, is recording secretary of the Association.

The *Florists' Exchange* for May 6, 1916, contained a very appreciative article entitled, "Brooklyn Botanic Garden: Notable Developments." Special mention was made of the spring planting for 1916, of the Japanese garden, and of the new rock garden, as well as of the wild flowers in bloom in the Garden in early May.

Dr. Louis Otto Kunkel, who has spent the past eight months in travel and botanical investigations in Sweden, Norway, Germany, and Switzerland on the Cutting travelling fellowship, of Columbia University, is spending the summer at the Garden as resident investigator, giving special attention to the life history of *Plasmodiophora* on cabbage and other crucifers, and to the powdery scab (*Spongospora*) on potato. While abroad Dr.

Kunkel was five weeks in Stockholm, one week at Christiania, five months at Freiberg, ten days at Berne, one week in Holland, three weeks in Berlin, and also visited Munich, Nuremberg, Tübingen, Darestadt, and Heidelberg, sailing from Copenhagen on June 8, on the "Peace ship," Oskar II.

A third edition of the booklet of "Information Concerning the Brooklyn Botanic Garden" has been issued. Copies may be had on application to the Secretary.

During the latter part of June work was resumed on the contract for the completion of the laboratory building and plant houses, after a delay of about one month, occasioned chiefly by labor difficulties.

On June 10 the Garden received from Mrs. Clarence R. Hyde, Brooklyn, a gift of 81 books on botany and gardening. Several of the books contain autograph letters from the authors to Mrs. Hyde's mother, Alice Morse Earle. Among the older books were a copy of Parkinson's *Paradisi in Sole Paradisus Terrestris,* London, 1629; and Bigelow's *Florula Bostoniensis,* 2nd Ed., Boston, 1824.

The second banana plant grown in our economic house is now forming a large bunch of fruit, which will doubtless be ripe by late October or early November.

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OF THE

BROOKLYN BOTANIC GARDEN

RECORD. Established January, 1912. An administrative periodical, issued quarterly. Contains, among other things, the annual report of the director and heads of departments, special reports, announcements of courses of instruction, miscellaneous papers, and notes concerning Garden progress and events. Free to members of the Garden and of the Department of Botany of the Institute. To others one dollar a year; 25 cents a copy.

CONTRIBUTIONS. Papers originally published in botanical or other periodicals, reissued as "separates," without change of paging, and numbered consecutively. This series includes occasional papers, as well as those embodying the results of research done at the Garden, or by members of its staff or students. Twenty-five numbers constitute one volume. Price 25 cents each, $5.00 a volume.

1. *The educational work of botanic gardens.* 13 pages. 1911.

2. *The purpose of an introductory course in botany.* 8 pages. 1911.

3. *Cryptomeric inheritance in Onagra.* 11 pages, figs. 2; plates 2. 1911.

4. *On the origin and present distribution of the pine-barrens of New Jersey.* 15 pages, figs. 2. 1912.

5. *Ingrowing sprouts of Solanum tuberosum.* 10 pages, figs. 6; plate 1. 1912.

6. *Intermingling of perennial sporophytic and gametophytic generations in Puccinia Podophylli, P. obtegens and Uromyces Glycyrrhizae.* 15 pages, 1 plate. 1913.

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8. *Some observations on the formation of the capillitium and the development of Physarella mirabilis Peck and Stemonitis fusca Roth.* 15 pages, 2 plates. 1914.

9. *The growth-forms of the flora of New York and vicinity.* 9 pages. 1915.

10. *Inheritance studies in Pisum. I. Inheritance of cotyledon color.* (In press.)

11. (In press.)

12. *Endemism in the flora of the vicinity of New York.* 10 pages. 1916.

13. *The origin of new varieties of Nephrolepis by orthogenetic saltation. I. Progressive variations.* 28 pages, 6 plates. 1916.

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1. *The Brooklyn Botanic Garden.* Price 5 cents.

LEAFLETS. Established April 10, 1913, and published weekly or biweekly during April, May, June, September, and October. The purpose of the Leaflets is primarily to give announcements concerning flowering and other plant activities to be seen in the Garden near the date of issue, and to give popular, elementary information about plant life for teachers and others. Current numbers free to all who wish them. Back series complete, 50 cents each; back numbers, 5 cents each.

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VOL. V OCTOBER, 1916 No. 4

EDITED BY

C. STUART GAGER

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BROOKLYN BOTANIC GARDEN

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Alabama Agricultural Experiment Station. Circular. Montgomery. **irreg.** *A, C, M, N.*

Alabama Agricultural Experiment Station. Farmers Leaflet. Auburn. **irreg.** *A, C.*

Alabama Agricultural Experiment Station. Press Bulletin. Auburn. **irreg.** *A, C, G, M.*

Alaska Agricultural Experiment Station. Circular. Washington. **irreg.** *A, C, G, M, N.*

American Botanist. Joliet. **q.** *G.*

American Fern Journal. Auburndale. **q.** *G.*

American Forestry. Washington. **m.** *A, B, C, G, N.*

American Journal of Botany. Lancaster. **m, except Aug. and Sept.** *C, G.*

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American Philosophical Society. Proceedings. Philadelphia. **m.** *A, C, G, N.*
American Society of Agronomy. Journal. Washington. **bi-m.** *C.*
Annales Mycologici. Berlin. **bi-m.** *C, G, N.*
Annals of Botany. London. **q.** *B,* on deposit at *B. B. G.; C, G, N.*
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Brooklyn Institute of Arts and Sciences. Bulletin. **w.** *A, B, C, G, M, N.*
Brooklyn Institute of Arts and Sciences. Children's Museum News. **8 times a year.** *A, B, G, M, N.*
Brooklyn Museum Quarterly. **q.** *A, B, M, N.*
Bryologist. Pittsburgh. **bi-m.** *G.*

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Canadian Forestry Journal. Ottawa. **m.** *N.*
Centralblatt für Bakteriologie. Parasitenkunde und Infektionskrankheiten. Jena. **bi-w.** *A, C, G, N.*
Charleston Museum. Bulletin. **8 times a year.** *A, G, M.*
Colorado College Publications. General Series. Colorado Springs. **irreg.** *A, G, N.*
Connecticut Agricultural Experiment Station. Bulletin. New Haven. **irreg.** *A, C, G, M, N.*
Cornell Rural School Leaflet. Ithaca. **q.** *A, B, C, M, N.*
Cornell University Agricultural Experiment Station. Bulletin. Ithaca. **irreg.** *A, B, C, G, M, N.*
Cornell University Agricultural Experiment Station. Cornell extension bulletin. Ithaca. **irreg.** *B, C, G, M.*
Cornell University Agricultural Experiment Station. Memoir. Ithaca. **irreg.** *B, C, G.*
Curtis's Botanical Magazine. London. **m.** *B,* on deposit at *B. B. G.; C,* on deposit at *G; N.*

Dansk botanisk Arkiv. Copenhagen. **irreg.** *C, G.*
Delaware Agricultural Experiment Station. Bulletin. Newark. **irreg.** *A, C, G, M, N.*
Deutsche Botanische Gesellschaft. Berichte. Berlin. **9 times a year.** *C,* on deposit at *G.*

Eugenical News. Cold Spring Harbor. **m.** *N.*

Flora, oder Allgemeine botanische Zeitung. Jena. **q.** *C, G.*
Florida Agricultural Experiment Station. Bulletin. Gainesville. **irreg.** *A, C, G, M, N.*
Florida Agricultural Experiment Station. Press Bulletin. Gainesville, **irreg.** *A, C, G, M, N.*
Forestry Quarterly. Washington. **q.** *A, B, C, G, N.*

Gardeners' Chronicle. London. **w.** *C,* on deposit at *G.*
Gardeners' Chronicle of America. New York. **m.** *G, N.*
Gardens' Bulletin. Straits Settlements. Singapore. **irreg.** *G.*
Genetics. Princeton. **bi-m.** *A, C, G, N.*

Hawaii Agricultural Experiment Station. Bulletin. Washington. **irreg.** *A, B, C, G, M, N.*
Hawaii Agricultural Experiment Station. Press Bulletin. Washington. **irreg.** *A, B, C, G, M, N.*
Herbarium. Leipzig. **irreg.** *G, N.*
Horticulture. Boston. **w.** *C, G, N.*

Illinois Agricultural Experiment Station. Bulletin. Urbana. **irreg.** *A, C, G, M, N.*
Illinois Agricultural Experiment Station. Circular. Urbana. **irreg.** *A, C, G, M, N.*
Illinois Agricultural Experiment Station. Soil Report. Urbana. **irreg.** *A, C, G, M, N.*
Indiana Agricultural Experiment Station. (Purdue University.) Bulletin. LaFayette. **irreg.** *A, C, G, M, N.*
Indiana Agricultural Experiment Station. (Purdue University.) Circular. LaFayette. **irreg.** *A, C, G, M, N.*
International Catalog of Scientific Literature—Botany. London. **y.** *A, C, G, N.*
International Institute of Agriculture. (Canada.) Bulletin of Foreign Agricultural Intelligence. Ottawa. **m.** *A, G, N.*
International Institute of Agriculture. International crop report and agricultural statistics. Rome. **m.** *C, G.*
International Institute of Agriculture. International review of the science and practice of agriculture. Rome. **m.** *G.*

Journal of Agricultural Research. Washington. **w.** *A, B, C, G, M, N.*
Journal of Agricultural Science. Cambridge, Eng. **q.** *A, C, G.*
Journal of Biological Chemistry. Baltimore. **m.** *A, C, G, N.*
Journal of Ecology. Cambridge, Eng. **q.** *A, C, G.*
Journal of Genetics. Cambridge, Eng. **q.** *A, C, G, N.*
Journal of Heredity. Washington. **m.** *A, C, G, N.*
Journal of Laboratory and Clinical Medicine. St. Louis. **m.**
Junior Agriculturist. Chico, Cal. **m.**
Just's botanischer Jahresbericht. Leipzig. **irreg.** *C, N.*

Kansas Agricultural Experiment Station. Bulletin. Topeka. **irreg.** *A, C, G, N.*
Kansas Agricultural Experiment Station. Circular. Manhattan. **irreg.** *A, C, G, M, N.*
Kentucky Agricultural Experiment Station. Bulletin. Lexington. **irreg.** *A, C, G, N.*
Kentucky Agricultural Experiment Station. Circular. Lexington. **irreg.** *A, C.*
Königlicher botanischer Garten und Museum zu Berlin. Notizblatt. Leipzig. **irreg.** *G.*

Landscape Architecture. Harrisburg. **q.** *B, C, G, N.*
Leiden. Royal Herbarium. Mededeelingen van's Rijks Herbarium. **irreg.** *G.*
Lilly Scientific Bulletin. Indianapolis. **irreg.** *C, G, N.*
Lloyd Library. Bibliographical Contributions. Cincinnati. **q.** *A, C, G, N.*
Lloyd Library. Letter by C. G. Lloyd. Cincinnati. **irreg.** *C, G.*
Lloyd Library. Mycological Notes. Cincinnati. **irreg.** *C, G, N.*

Maine Agricultural Experiment Station. Bulletin. Orono. **m.** *A, C, G, M, N.*
Maryland Agricultural Experiment Station. Bulletin. College Park. **irreg.** *A, C, G, N.*
Massachusetts Agricultural Experiment Station. Bulletin. Amherst. **irreg.** *A, C, G, M, N.*
Massachusetts Agricultural Experiment Station. Control Series Bulletin. Amherst. **irreg.** *A, C, G, M, N.*
Massachusetts Agricultural Experiment Station. Circular. Amherst. **irreg.** *C, N.*
Michigan Agricultural Experiment Station. Bulletin. East Lansing. **irreg.** *A, C, G, N.*
Michigan Agricultural Experiment Station. Circular. East Lansing. **irreg.** *A, C, G, N.*
Michigan Agricultural Experiment Station. Special Bulletin. East Lansing. **irreg.** *A, C, G, N.*
Michigan Agricultural Experiment Station. Technical Bulletin. East Lansing. **irreg.** *A, C, G, N.*
Minnesota Agricultural Experiment Station. Bulletin. St. Paul. **irreg.** *A, C, G, M, N.*
Mississippi Agricultural Experiment Station. Bulletin. Agricultural College. **irreg.** *A, C, G, N.*
Missouri Agricultural Experiment Station. Bulletin. Columbia. **irreg.** *A, C, G, N.*
Missouri Agricultural Experiment Station. Circular. Columbia. **irreg.** *A, C, G, N.*
Missouri Botanical Garden. Annals. St. Louis. **q.** *A, C, G, N.*
Missouri Botanical Garden. Bulletin. St. Louis. **m.** *G.*
Missouri State Teachers' Association. Bulletin. Columbia. **q.**
Missouri, University of. College of Agriculture. Agricultural Copy Service. Columbia. **irreg.** *C, N.*
Missouri, University of. College of Agriculture. Press Bulletin. Columbia. **irreg.** *C, N.*
Montana Agricultural Experiment Station. Bulletin. Bozeman. **irreg.** *A, C, G, N.*
Montana Agricultural Experiment Station. Circular. Bozeman. **irreg.** *A, C, G, N.*
Mulford Digest. Philadelphia. **irreg.**

Mycologia. New York. **bi-m.** *C, G.*
Mycologisches Centralblatt. Jena. **m.** *C.*

Natal Government Museum, Pietermaritzburg, South Africa. Annals. London. **y.** *A, N.*
National Academy of Sciences. Proceedings. Baltimore. **m.** *A, C, G, N.*
National Geographic Magazine. Washington. **m.** *A, B, C, M, N.*
National Plant, Flower and Fruit Guild Magazine. New York. **q.** *G, N.*
Nature Study Review. Ithaca. **9 times a year.** *A, B, C, G, N.*
Nebraska Agricultural Experiment Station. Bulletin. Lincoln. **irreg.** *A, C, G, M, N.*
Nebraska Agricultural Experiment Station. Extension Bulletin. Lincoln. **irreg.** *A, C, G, M, N.*
Nebraska Agricultural Experiment Station. Research Bulletin. Lincoln. **irreg.** *A, C, G, M, N.*
Nevada Agricultural Experiment Station. Bulletin. Carson City. **irreg.** *A, C, G, M, N.*
Nevada Agricultural Experiment Station. Technical Bulletin. Carson City. **irreg.** *A, C, G.*
New Hampshire Agricultural Experiment Station. Bulletin. Durham. **irreg.** *A, C, G, N.*
New Hampshire Agricultural Experiment Station. Scientific Contributions. Durham. **irreg.** *C, G, N.*
New Jersey Agricultural Experiment Station. Bulletin. New Brunswick. **irreg.** *A, C, G, M, N.*
New Jersey Agricultural Experiment Station. Circular. New Brunswick. **irreg.** *A, C, G, M, N.*
New Jersey State Agricultural College. Extension Bulletin. New Brunswick. **irreg.** *A, C, G, M, N.*
New Mexico Agricultural Experiment Station. Bulletin. Las Cruces. **irreg.** *A, C, G, M, N.*
New Phytologist. London. **10 numbers a year.** *C, G.*
New York City. The City Record. **d.** *B, C, G, N.*
New York City. Board of Estimate and Apportionment. Calendar. **w.** *C, N.*
New York (City) Department of Health. Monthly Bulletin. **m.** *A, B, C, M, N.*
New York (City) Department of Health. Weekly Bulletin. **w.** *B, C, N.*
New York (State) Agricultural Experiment Station. Bulletin. Geneva. **irreg.** *A, C, G, M, N.*
New York (State) Agricultural Experiment Station. Technical Bulletin. Geneva. **irreg.** *A, C, G, N.*
New York (State) Conservation Commission. Division of Lands and Forests. Bulletin. Albany. **irreg.** *B, G.*
New York State Forestry Association. Bulletin. Rochester. **q.** *B, G.*
New York Academy of Sciences. Bulletin. **w.** October to May. *A, C, G, M, N.*

New York Botanical Garden. Bulletin. **irreg.** *A, C, G, N.*
New York Botanical Garden. Journal. **m.** *A, C, G, N.*
North Carolina Agricultural Experiment Station. Bulletin. Raleigh. **irreg.** *A, C, G, N.*
North Carolina Agricultural Experiment Station. Circular. Raleigh. **irreg.** *A, C, N.*
North Dakota Agricultural Experiment Station. Bulletin. Agricultural College. **irreg.** *A, C, G, N.*
North Dakota Agricultural Experiment Station. Circular. Agricultural College. **irreg.** *A, C, G, N.*
Nuova notarisia. Padua. **q.** *C,* on deposit at *G.*
Nuovo giornale botanico italiano. Florence. **q.** *C,* on deposit at *G.*
Nyt Magazin for Naturvidenskaberne. Christiania. **irreg.** *C, G.*

Ohio (State) Agricultural Experiment Station. Bulletin. Wooster. **irreg.** *A, C, G, M, N.*
Ohio (State) Agricultural Experiment Station. Circular. Wooster. **irreg.** *A, C, G, M, N.*
Ohio (State) Agricultural Experiment Station. Monthly Bulletin. Wooster. **m.** *A, C, G, M, N.*
Ohio (State) Biological Survey. Bulletin. Columbus. **irreg.** *A, C, G, N.*
Ohio Journal of science. Columbus. **8 times a year.** *A, G, M, N.*
Oklahoma Agricultural Experiment Station. Bulletin. Stillwater. **irreg.** *A, C, G, N.*
Oklahoma Agricultural Experiment Station. Circular. Stillwater. **irreg.** *C, G.*
Oregon Agricultural Experiment Station. Station Bulletin. Corvallis. **irreg.** *A, C, G, N.*

Paris. Institut de France. Comptes rendus hebdomadaires des Séances de L'Académie des Sciences. **w.** *A, C, N.*
Pennsylvania Agricultural Experiment Station. Bulletin. State College. **irreg.** *A, B, C, G, M, N.*
Pennsylvania State College. Contributions from the Department of Botany. **irreg.** *G.*
Peradeniya, Ceylon. Annals of the Royal Botanic Gardens. Colombo. **irreg.** *G.*
Philadelphia. Academy of Natural Sciences. Proceedings. **3 times a year.** *A, C, G, M, N.*
Philippine Journal of Science. Section A. Chemical and Geological Sciences. Manila. **bi-m.** *A, B, C, M, N.*
Philippine Journal of Science. Section C. Botany. Manila. **bi-m.** *A, B, C, G, M, N.*
Physiological Researches. Baltimore. **irreg.** *C.*
Plant World. Baltimore. **m.** *C, G.*
Porto Rico Agricultural Experiment Station. Bulletin. Washington. **irreg.** *A, B, C, G, M, N.*

Practical Druggist. New York. **m.** *G.*
Puget Sound Marine Station. Publications. Seattle. **irreg.** *G.*

Revue général de botanique. Paris. **m.** *C,* on deposit at *G.*
Rhode Island Agricultural Experiment Station. Bulletin. Kingston. **irreg.** *A, C, G, N.*
Rhodora. Boston. **m.** *G.*
Roger Williams Park. Park Museum. Bulletin. **bi-m.** *A, G, M.*
Royal Horticultural Society. Journal. London. **3 numbers a year.** *G, N.*

School Science and Mathematics. Mount Morris, Ill. **9 times a year.** *B, C, N.*
Società botanica italiana. Bullettino. Florence. **9 numbers a year.** *C,* on deposit at *G.*
Società botanica italiana. Bullettino bibliografico della botanica italiana. Florence. **Twice a year.** *G.*
Société vaudoise des sciences naturelles. Bulletin. Lausanne. **3 or 4 times a year.** *A, G, M, N.*
South Carolina Agricultural Experiment Station. Bulletin. Clemson College. **irreg.** *A, C, G, N.*
South Carolina Agricultural Experiment Station. Circular. Clemson College. **irreg.** *A, C.*
South Dakota Agricultural Experiment Station. Bulletin. Brookings. **irreg.** *A, C, G, M, N.*
Staten Island Association of Arts and Sciences. Museum Bulletin. New Brighton. **m.** *A, B, C, G, M, N.*
Storrs (Conn.) Agricultural Experiment Station. Bulletin. **irreg.** *A, C, G, M, N.*
Svensk botanisk Tidsskrift. Stockholm. **9 times a year.** *G.*

Tennessee Agricultural Experiment Station. Bulletin. Knoxville. **irreg.** *A, C, G, N.*
Tohoku Imperial University. Journal of the College of Agriculture. Sapporo, Japan. **5 times a year.** *C, G, N.*
Tokyo, Imperial University of. Journal of the College of Agriculture. **irreg.** *A, C, G, M.*
Tokyo, Imperial University of. Journal of the College of Science. **irreg.** *A, C.*
Torrey Botanical Club, Bulletin of the. New York. **m.** *A, B, C, G.*
Torreya. New York. **m.** *A, C, G, N.*
Tree Talk. Stamford. **q.** *G, N.*
Trinidad and Tobago. W. I. Department of Agriculture. Bulletin. **m.** *A, G.*

U. S. Dept. of Agriculture. Bulletin. Washington. **irreg.** *A, B, C, G, M, N.*

U. S. Dept. of Agriculture. Experiment Station Record. Washington. **m.** *A, B, C, G, M, N.*

U. S. Dept. of Agriculture. Farmers' Bulletin. Washington. **irreg.** *A, B, C, G, M, N.*

U. S. Dept. of Agriculture. Monthly List of Publications. Washington. **m.** *A, B, C, G, M, N.*

U. S. Dept. of Agriculture. Bureau of Crop Estimates. Monthly Crop Report. Washington. **m.** *A, B, C, G, N.*

U. S. Dept. of Agriculture. Bureau of Plant Industry. Inventory of Seeds and Plants Imported. Washington. **irreg.** *A, B, C, G, M, N.*

U. S. Dept. of Agriculture. Bureau of Plant Industry. Plant Immigrants. Washington. **m.** *B, C, G.*

U. S. Dept. of Agriculture. Weather Bureau Climatological Data. Washington.

New England Section. **m.** *A, C G, M.*

New Jersey Section. **m.** *A, C, G, M, N.*

New York Section. **m.** *A, B, C, G, M, N.*

Pennsylvania Section. **m.** *A, C, G, M.*

U. S. Dept. of Agriculture. Weather Bureau. Monthly Weather Review. Washington. **m.** *A, B, C, G, M, N.*

U. S. Dept. of Agriculture. Weather Bureau. National Weather and Crop Bulletin. Washington. **w. during the season.** *A, B, N.*

U. S. Dept. of Agriculture. Weather Bureau. Snow and Ice Bulletin. Washington. **w. during the season.** *G, M.*

U. S. National Museum. Contributions from the U. S. National Herbarium. Washington. **irreg.** *A, B, C, G, N.*

U. S. National Museum. Proceedings. Washington. **irreg.** *A, B, C, M, N.*

Utah Agricultural Experiment Station. Bulletin. Logan. **irreg.** *A, C, G, M, N.*

Utah Agricultural Experiment Station. Circular. Logan. **irreg.** *A, C, G, M, N.*

Vermont Agricultural Experiment Station. Bulletin. Burlington. **irreg.** *A, C, G, M, N.*

Vermont Agricultural Experiment Station. Circular. Burlington. **irreg.** *C, G, N.*

Virginia Agricultural Experiment Station. Bulletin. Blacksburg. **irreg.** *A, C, G, N.*

Washington Agricultural Experiment Station. Bulletin. Pullman. **irreg.** *A, C, G, N.*

Washington Agricultural Experiment Station. Popular Bulletin. Pullman. **irreg.** *A, C, G, N.*

Washington Agricultural Experiment Station. Department of Extension Series. Pullman. **irreg.**

Wisconsin Agricultural Experiment Station. Bulletin. Madison. **irreg.** *A, C, G, M, N.*
Wisconsin, University of. Agricultural Experiment Station. Research Bulletin. Madison. **irreg.** *C, G, M, N.*
Wyoming Agricultural Experiment Station. Bulletin. Laramie. **irreg.** *A, C, G, M, N.*

Zeitschrift für Botanik. Jena. **m.** *C, G.*
Zeitschrift für das landwirtschaftliche Versuchswesen in Oesterreich. Vienna. **m.**
Zeitschrift für induktive Abstammungs—und Vererbungslehre. Leipzig. **irreg.** *A, C, G, N.*
Zeitschrift für Pflanzenkrankheiten. Stuttgart. **bi-m.** *C,* on deposit at *G, N.*
Zeitschrift für Pflanzenzuchtung. Berlin. **q.** *C, N.*

LAURA E. WATSON BENEDICT

WHAT THE WINTER OF 1916 DID TO THE GARDEN EVERGREEN COLLECTIONS

During the last two decades there has been no such disastrous winter for evergreens as we experienced in January, February and March of this year. A recent checking of the coniferous collections shows the Garden's loss to have been over eighty specimen plants, valued at somewhat over six hundred dollars.

In the juniper collection, *Juniperus chinensis Fortunei, J. communis, J. suecia, J. sabina fastigiata, J. pachyphloea glauca* (3), and *J. neaboriensis* were killed, while such a supposedly hardy species as *J. rigida,* of Japan, was badly winter-killed. It is now (August) growing vigorously. Near these is our best specimen of *Cryptomeria japonica,* now nine feet high, which was fortunately only slightly winter-killed and is now growing well. *Sequoia gigantea* was more "burned" than usual during the winter, but is recovering satisfactorily.

Among the arbor vitaes, nearly all derived from two perfectly hardy species, one American and the other Japanese, there has been heavy loss. In *Thuja occidentalis argentea,* one specimen is slightly winter-killed but is making only poor recovery, and the other two specimens were cut back from about six feet to one foot,

and will never be good specimens again. This severe cutting back was also necessary in *T. occidentalis pyramidalis, T. occidentalis aurea,* and *T. occidentalis plicata.* More than thirty plants in the arbor vitae hedge along Washington Avenue, near the laboratory building, had to be replaced this spring. Dust and smoke may, however, have something to do with the loss in this hedge. A surprising survival, near the arbor vitae collection, is *Torreya nucifera* from the southern islands of Japan. Always doubtfully hardy in this latitude, both our plants of this species, which have been here since 1911, are doing splendidly. The same is true of *Ephedra distachya* and *Taxodium distichum.* Of all the yew collection only *Taxus baccata hibernica* is dead, the rest apparently coming off scathless.

The most serious individual losses are two fine specimens of *Sciadopitys verticillata,* both from the Lowell M. Palmer collection, and grown here since 1911. One is dead and the other is making only feeble recovery. Near here are large plants of *Pseudolarix Kaempferi,* from Japan, a deciduous conifer which has proved perfectly hardy. Fortunately, none of the recent conifer collections from China, most of them as yet small plants, have been planted out in the collections, and were carried through safely in pits or other protected places.

The beautiful horticultural retinosporas, belonging to the genus *Chamaecyparis,* suffered heavily. The following were all cut back from splendid specimen plants averaging six to eight feet to small fragments scarcely a foot high: *C. obtusa, C. Veitchii, C. Lawsoniana, C. pisifera squarrosa,* and *C. pisifera plumosa aurea.* Somewhat less severely winter-killed was *C. obtusa nana* and *C. lycopodioides,* while *C. nutkatensis glauca* and *C. nutkatensis glauca pendula* are none the worse. All of this collection came from the Lowell M. Palmer estate, and has been at the Garden ever since it started.

The percentage of plants killed among the firs is great: *Abies Fraseri, A. arizonica, A. grandis, A. subalpina, A. Pinsapo, A. magnifica, A. Appolinis,* and *A. cilicica* being among the number. Many of these were in duplicate or triplicate, and a good many of them have been here since the early days of the Garden. *Abies numidica* is badly winter-killed, but appears to be growing

again. Near the firs are the cedars, where *Cedrus atlantica* died and others of the same species, but older, are alive and healthy. *Cedrus Deodara* seems to be making only a feeble recovery. The spruces are also in a similar situation where there is considerable exposure to wind. Only *Picea pungens glauca* was rather winter-killed, two unnamed species, here since 1911, are dead, but all the others seem fairly healthy.

A study of the weather reports for January, February and March shows a curious reversal of ordinary winter weather in 1916. January was more than six degrees warmer than the normal, while rain and snow were 2.7 inches below normal. On January 27 the maximum temperature was 69°, a nearly fatal condition of itself without the inclemencies that were to follow in February and March. On January 14, 17, 22, 23, and 28 there were winds of from 51 to 62 miles per hour. This coupled with the warmth and slight rainfall was a poor preparation for February. The latter month began, on the first, with another high temperature of 61°; the average temperature, however, was 1.7° below normal. There were terrific winds on February 7, 18, 19, 26, 27, 28, varying from 53 to 75 miles per hour, and there was about the usual precipitation. In other words, our conifers had, up to March first, withstood a warm, dry January, a slightly colder, but scarcely more moist February, to the accompaniment of violent winds during both months. It was in March, however, that the climax of bad weather was reached. Throughout the month the temperature averaged 5.3° below the normal, the precipitation was only about normal and the January deficiency was never recovered until April, when it was too late. After a period of comparatively mild weather the lowest temperature of the winter was reached on March 18 when, with the thermometer hovering between 7° and 10° above zero, the wind blew almost sixty miles an hour. This undoubtedly proved the climax in a period of bad weather, the effects of which it will take the Garden many years to repair.

NORMAN TAYLOR.

THE COLLECTION OF *NEPHROLEPIS* VARIETIES AT THE BROOKLYN BOTANIC GARDEN*

Some eight months ago, the writer published in the trade press an account of the *Nephrolepis* collection at the Brooklyn Botanic Garden, together with a suggestion for a means of cooperation between the Garden and florists which would be of mutual benefit. The offer made in behalf of the Garden was, first, to send out small plants of named varieties from a list then published, as far as duplicates were available, the purpose being to aid florists in building up collections and testing new varieties. Second, the Garden offered to act as a bureau of information regarding these ferns, and, in this connection, offered to send out copies of a reprint of the *Nephrolepis* article from the *New Standard Cyclopaedia of Horticulture*. Florists were asked in return to send information to correct or supplement the statements in the article, and also to send plants of varieties not on the list. The present statement is in the nature of a report on the results obtained with a further offer of cooperation on the same lines as before.

About two hundred copies of the *Nephrolepis* article have been sent out, the great majority to commercial growers. Several hundred small plants have been distributed in lots varying from five to thirty different kinds, according to what was available. These have gone to all corners of the United States, and applications have come from Australia and New Zealand. A considerable number of florists have thus been able to build up collections for exhibition purposes, and at least one grower expects to add one form so obtained to the list offered in a mail order catalogue.

The *Nephrolepis* investigation work at the Garden has also profited. The collection of *Nephrolepis* forms has more than doubled. The list previously published included forty named sports of *N. exaltata bostoniensis*. The present list includes seventy. Of varieties of other species, fifteen names were given before. Now there are fifty names. It should be noted that I say "fifty names," not fifty varieties. Some of these names are undoubtedly synonyms. The list of actually distinct forms may

* This article was published in various horticultural journals during the autumn of 1916. *Ed.*

not be more than thirty, but it is yet impossible certainly to determine the proper names for these varieties or the exact number of different kinds. The difficulty in correctly classifying these forms is due, in part, to carelessness and inaccuracy on the part of the growers and others, and in part to the fact that the classification of the original species of *Nephrolepis* is an unusually difficult problem.

Besides the named varieties a considerable number of unnamed kinds have been sent in for experimental growing, to the number of at least fifty. When full-grown plants of all kinds are developed it will undoubtedly be found that some of these unnamed forms are duplicates of varieties already in the trade. It is safe to say, however, that the present living collection at the Garden includes at least one hundred and twenty-five distinct varieties of *Nephrolepis*.

About thirty of this increase of sixty-odd kinds have been obtained by purchase from English and French growers. The remainder have been received through the cooperation of American growers and botanic gardens. The Bureau of Plant Industry, through its Office of Foreign Plant Introduction, is now cooperating through its agents in all parts of the tropics, who are collecting specimens of the wild forms to be grown and compared with the types under cultivation.

The writer has continued his visits to commercial establishments through the aid of a grant of one hundred dollars from the American Association for the Advancement of Science. Growers in Columbus and Springfield, Ohio, and in and about Boston, New York, and Philadelphia have been visited, some of them several times. A great deal of valuable information has been gained in this way. A partial scientific report of the study of these plants has been published in the May number of the *Bulletin of the Torrey Botanical Club*, and reprinted as *Contributions Number 13* of the Brooklyn Botanic Garden. Further reports are in preparation.

In the meantime the facilities of the collection continue to be available for the benefit of florists. Small plants of named varieties will be sent on application as far as the stock of duplicates allows. Definite applications for few and specific varieties will

receive preference over general applications, but all will be served as far as possible. If general applications are made for the purpose of building up collections of varieties, the request for specimens should include a list of the kinds already being grown, to avoid duplication.

Not all the varieties listed here are available for distribution, although there is a much larger assortment than last year. Some have only recently been received from England, and there has been insufficient time for propagation of small plants. Others, especially some in the second group, are very slow to reproduce, or are so large and require so much space that it has not been possible to give them bench room. In general, the varieties in the second group are mostly of little commercial value in the United States except for large collections.

Perhaps the collection can find its greatest value for florists as a clearing house of information about *Nephrolepis* forms. How this might work out was suggested recently by a well-known grower of the New York district. As president of one of the local growers' associations he had had occasional requests for an opinion as to the value and distinctiveness of some supposedly new form of *Nephrolepis,* sent in by some florist of the district. The only means of answering such a question would be by reference to some practically complete collection of these forms. The writer will be glad to answer questions along this line and regarding any other phase of interest in connection with these ferns. Visitors are welcome at any time.

RALPH CURTISS BENEDICT

NEPHROLEPIS EXALTATA AND ITS VARIETIES

Once-Pinnate Forms

exaltata. Wild species, tropics generally.
bostoniensis. F. C. Becker, Cambridge, Mass., and others.
Childsi. J. L. Childs, Floral Park, L. I.
Dreyeri Dreyer Brothers, Whitestone, N. Y.
Dwarf Boston. F. R. Pierson, Tarrytown, N. Y.
Edmontoniensis. H. B. May & Sons, Upper Edmonton, England.
falcata. Peter Wagner, Brooklyn, N. Y. (There is also an English *falcata.*)
Gretnai. B. M. Wichers & Co., Gretna, Louisiana.

Giatrasi. George Giatras, West Hoboken, N. J.
Harrisi. Wm. K. Harris & Co., Philadelphia, Penn.
New York. George Giatras, West Hoboken, N. J.
Randolphi. Randolph & Sons, Verona, Penn.
Roosevelti. American Rose & Plant Co., Springfield, Ohio
Schultheisi. Anton Schultheis, College Point, N. Y.
Scotti. John Scott Estate, Brooklyn, N. Y.
*splendida.** Good & Reese Co., Springfield, Ohio.
Teddy Jr. American Rose & Plant Co., Springfield, Ohio.
viridissima. F. R. Pierson, Tarrytown, N. Y.
Wagneri. Peter Wagner, Brooklyn, N. Y.
*Wanamakeri.** Robert Craig, Philadelphia, Penn.

Twice-Pinnate Forms

Anna Foster. Lucius Foster, Dorchester, Mass.
Baby Pierson. (Parentage uncertain.)
Barrowsi. Henry H. Barrows & Son, Whitman, Mass.
Clarki.† Clark. (?)
duplex Bernsteili. (?)
Elmsfordi. Scott Brothers, Elmsford, N. Y.
fosteriana. (Same as Anna Foster.)
Kingessing. Wm. K. Harris & Co., Philadelphia, Penn.
Millsi. Wm. K. Harris & Co., Philadelphia, Penn.
Piersoni. F. R. Pierson, Tarrytown, N. Y.
Piersoni "improved." Good & Reese Co., Springfield, Ohio.
robusta. Robert Craig, Philadelphia, Penn.
Schilleri. J. L. Schiller, Toledo, Ohio.
Scholzeli. Herman Scholzel, New Durham, N. J.
splendida. Good & Reese Co., Springfield, Ohio.
superbissima. F. R. Pierson, Tarrytown, N. Y.

Three-Pinnate Forms.

*Clarki.** Clark. (?)
elegantissima. F. R. Pierson, Tarrytown, N. Y.
elegantissima "improved." F. R. Pierson, Tarrytown, N. Y.
elegantissima compacta. F. R. Pierson, Tarrytown, N. Y.
elegantissima cristata. (?) (English.)
exaltata cristata. (?) (English.)
Galvestoni. J. D. Pruessner, Galveston, Texas.
lycopodioides. Thomas Rochford & Sons, Herts, England.
muscosa. F. R. Pierson, Tarrytown, N. Y.
Piersoni compacta. = *elegantissima compacta.*
Pruessneri. J. D. Pruessner, Galveston, Texas.

* Produces some 2-pinnate leaves.
† As typically developed, 3-pinnate.

Scholzeli. Herman Scholzel, New Durham, N. J.
superior. Superior Nursery, Los Angeles, Cal.
todeoides. Thomas Rochford & Sons, Herts, England.
todeoides compacta. Thomas Rochford & Sons, Herts, England.
todeoides superba. Thomas Rochford & Sons, Herts, England.
Verona. S. Randolph & Sons, Verona, Penn.
Whitmani. Henry H. Barrows & Son, Whitman, Mass.
Whitmani "improved." Henry H. Barrows & Son, Whitman, Mass.
Whitmani compacta. Henry H. Barrows & Son, Whitman, Mass.
Wichersi. B. M. Wichers & Co., Gretna, La.
Wredii. Thomas Rochford & Sons, Herts, England.

Four-Pinnate Forms

Amerpohli. Edward Amerpohl, Janesville, Wis.
dissecta. (English.)
Goodii. Good & Reese Co., Springfield, Ohio.
"*gracillima.*" (Not certainly the original gracillima of Barrows).
magnifica. Henry H. Barrows & Son, Whitman, Mass.
Marshalli. H. B. May & Sons, Upper Edmonton, England.
Marshalli compacta. H. B. May & Sons, Upper Edmonton, England.
Neuberti. Neubert.
pulcherrima. (English.)
Rochfordi. Thomas Rochford & Sons, Herts, England.
Smithi. J. Clark, Washington Botanic Garden.

Five-Pinnate Forms

Craigi. Robert Craig, Philadelphia, Penn.
Willmotae. H. B. May & Sons, Upper Edmonton, England.

NEPHROLEPIS VARIETIES AND SPECIES OTHER THAN EXALTATA

acuminata
acuta
Barteri
Bausei
biserrata
biserrata (davallioides) furcans
biserrata furcans minor (davallioides furcans minor)
biserrata var. (Undetermined form)
canaliculata
concinna
cordata compacta = *cordifolia compacta*
cordifolia compacta
cordifolia gigantea
cordifolia elegans
cordifolia tessalata
crispata congesta
davallioides = *biserrata*
davallioides furcans = *biserrata furcans.*
Duffii
exaltata (= *cordifolia*)
"*exaltata furcans*" = biserrata furcans
"*exaltata grandiceps*" = biserrata furcans minor
floccigera

"Golwigheriana" (= *Zollingeriana?*)
hirsutula
hirsutula tripinnatifida
Longii (=superba)
Mayii
Mayii cristata
Mayii ornata
pectinata
philadelphiensis
pluma
recurvata
rivularis
rufescens (=*hirsutula*)
rufescens amabilis
rufescens elegans
rufescens tripinnatifida
splendens
superba
tuberosa
tuberosa plumosa
washingtoniensis
Westoni
Wittboldii
Zollingeriana

THIRD CHILDREN'S GARDEN EXHIBIT

The third annual children's garden exhibit was held at the Brooklyn Botanic Garden, September 29 and 30, 1916. For several reasons it was thought that the exhibit would be far inferior to that of last year; the schools began late, the date of our exhibit was late, and the epidemic of infant paralysis that spread from Brooklyn, during June–September, was generally upsetting. Notwithstanding, the third exhibit was perhaps better than that of last year, though not as many schools competed. Those schools in sections where there are still cases of paralysis felt it was not wise nor safe to have things brought from home for any purpose. Other schools had only fifty per cent. of their children in attendance and some of these schools felt it to be almost futile to try to compete.

On Wednesday afternoon Public School 43 sent five loads of window boxes and potted material, plants started and cared for by the children and sent to their homes during the summer. Much of this material was cared for under the poorest of conditions. This exhibit covered the entire space of one side of our room and was an extremely creditable entry.

Public School 152 sent their usual well-arranged exhibit. It was not as large as last year, but showed the same interest and care.

The Park gardens, under the direction of the Department of

Parks of this city, sent exhibits which were composed of excellent garden vegetables and some fine specimen plants.

The individual display, that is, the material entered by children as individuals and not as members of schools, was much smaller this year than the two previous years. This can be accounted for by the fact that schools urged their children to exhibit with the schools, and so swell that exhibit, rather than work for themselves alone.

There were about 1,000 exhibits in all. The following list gives the prize winners in each class:

School Display

Public School 152, 1st prize.
Public School 98, 2d prize.
Public School 82, honorable mention.
Public School 89, honorable mention.

Community Garden Display

McCarren Park, 1st prize.
Betsy Head garden, 2d prize.
Highland Park garden, honorable mention.

Box Display for Schools

Public School 43, 1st prize.
Public School 36, 2d prize.

Flower Display

Alyssum, Veronica O'Brien Bay Ridge High, 1st; Julius Buxbaum, P. S. 36, 2d; Tillie Brownstein, P. S. 21, hon. men. *Asters* (*blue*), Henrietta Kramer, P. S. 108, 1st; Celia Rosen, P. S. 36, 2d. *Asters* (*pink*), Julius Buxbaum, P. S. 36, 1st; *Asters* (*white*), William Kopp, P. S. 36, 1st; *Calendula,* Sylvester Mann, McCarren Park, 1st; *Dianthus,* James O'Shea, McCarren Park, 1st; *Marigold,* Theodore DeCastro, P. S. 36, 1st; *Nasturtium,* Frances Burke, Bay Ridge High, 1st; *Sunflower,* Mildred Costigan, P. S. 98, 1st; Maurice Reilly, McCarren Park, 2d; *zinnia,* George Kretak, McCarren Park, 1st; Edward Watson, P. S. 139, 2d; John Kennedy, McCarren Park, hon. men.

Vegetables

Beans (bush), George Kinsella, P. S. 98, 1st; *Beans,* Milton Hudders, Commercial High, 1st; Beatrice Anderson, St. Joseph's, 2d. *Beets,* Dorothy VonFricken, P. S. 98, 1st; Edward Staut, P. S. 89, 2d. *Carrots,* Wilbur Bennett, P. S. 139, 2d. *Corn,* Clifton Nelson, P. S. 152, 1st; Elwood Middleton, P. S. 152, 2d. *Egg plant,* Harry Johnson, P. S. 89, 1st; Gilda Monzillo, Bay Ridge High, 2d; Clara Schlevogt, P. S. 153, hon. men. *Kohlrabi,* Clara Rogatski, P. S. 23, 2d. *Peppers,* Maurice Campbell, P. S. 129, 1st; Gilda Monzillo, Bay Ridge High, 2d. *Squash,* Anthony Varvaro, P. S. 36, 1st; Maurice Campbell, P. S. 129, 2d. *Tomatoes (green)*, Harold Uhrbrock, Manual Training High, 1st. Catherine Collins, P. S. 98, 2d. *Tomatoes (red)*, Jack French, P. S. 152, 1st; Clifton Nelson, P. S. 152, 2d. *Tomatoes (dwarf)*, Catherine Collins, P. S. 98, hon. men.

Best Special Plant

Alice Schlevogt, P. S. 153, 1st; Maurice Reilly, McCarren Park, 2d; Arthur Jacobson, P. S. 129, hon. men. Thomas McDonald, P. S. 12, Emanuel Senate, McCarren Park, Alice Schlevogt, P. S. 153, Sherman Kearns, P. S. 98, Walter Holt, P. S. 89, Robert Rountree, P. S. 9, Gerard Toombs, P. S. 98, all hon. men.

Individual Garden Display

Theodore Hall, P. S. 152, 1st; Edmond O'Donnel, P. S. 89, 2d; Henrietta Kramer, P. S. 108, hon. men.

Weed Display

Blanche O'Day, Bay Ridge High, 1st; William Pfezenmeier, P. S. 36, 2d.

Wild Flower Display

Adele Quitman, Bay Ridge High, 1st; Gordon Hart, P. S. 3, 1st Helen Cherouny, Bay Ridge High, 2d; Louise Wiegand, P. S. 36, 2d; Grade 8B[1], P. S. 36, hon. men.

Back Yard Gardens

Elias Osher, P. S. 43, 1st; William & James Nedwell, P. S. 98, 1st. Ambrose Connor, P. S. 98, 2d; George & Charles Kinsella, P. S. 98, hon. men.

The school trophy in class A was won for the third time by Public School 152, and thus becomes the property of that school. Next year a new trophy will be offered for competition. Public School 43 and McCarren Park won first prizes in classes B and

C; these prizes are large silver cups. Second prizes in A, B, and C are small silver cups. These cups remain the permanent property of the winners. As usual the individual first prizes are silver medals, the second prizes bronze medals, and honorable mention in all classes is a certificate.

The Teachers-Garden Association of the Brooklyn Botanic Garden presents each year a cup to the boy or girl who has been registered in the Garden more than one year, and who has done work of superior excellence. This year the cup was won by Gladys Bergman.

ELLEN EDDY SHAW

NOTES

Professor Ralph W. Curtis and Mr. C. E. Hunn, of the department of landscape art of Cornell University, visited the Garden September 30.

Professors J. B. S. Norton, state pathologist, and W. R. Ballard, pomologist, from the Maryland Experiment Station, visited the Garden September 27.

Professor George E. Stone, botanist of the Massachusetts Agricultural Experiment Station, who has been spending some time in study at the New York Botanical Garden, visited the Garden August 21.

Mr. Wilson Popenoe, agricultural explorer of the Bureau of Plant Industry, U. S. Department of Agriculture, came to the Garden on August 24 to consult concerning the collecting of ferns of the Boston fern group, during an exploring trip which he is about to undertake to Central America. He sailed on August 25.

Mr. John Ellis, gardener, resigned on June 30 to accept the position of head gardener of the department of botany and plant pathology at the Pennsylvania State College.

Miss Charlotte Elliott acted as research assistant in the Garden laboratory during August and September. Miss Elliott's academic record is as follows: Leland Stanford, Jr. University, A.B.,

1907; A.M., 1913; teacher of biology, State Normal School, Spear Fish, S. D., 1908–12; instructor in botany, State College, Brookings, S. D., 1914–16.

Mr. Jackson Thornton Dawson, superintendent of the Arnold Arboretum (Jamaica Plain, Mass.) since its foundation, and widely known as a horticulturist, died on August 3, 1916, after a brief illness. He was seventy-five years old. A large part of the success of the Arboretum has been attributed by its director to Mr. Dawson's skill in growing plants. He has had the rare and satisfying experience of enjoying in the Arboretum the shade of large forest trees which he himself raised from the seed. Many of the finest specimens in the Arboretum, of both trees and shrubs, were propagated from seedpans by Mr. Dawson.

The July, 1916, issue of the *Gardeners' Chronicle of America* contained, under the title "Popular Hedge Plants for General Use," a reprint of Brooklyn Botanic Garden Leaflets, Series II, No. 9 (September 16, 1914). The reprint was illustrated with three half-tone cuts.

We learn from *Science* (for July 28, 1916) that the Stanford University Arboretum, comprising about 200 acres, and established by Senator Stanford in 1882, has been placed under the control of the department of botany of the university, with a view to utilize it more fully for scientific purposes. An annual appropriation is to be made for the acquisition of specimens, that for the current year being $1,000. Mr. H. A. Greene, president of the Monterey Tree Growing Club, has presented the Arboretum with 200 species, many of which are rare and impossible to obtain through ordinary trade channels. Mr. John McLaren, superintendent of Golden Gate Park, San Francisco, will assist in the general planting, especially along the principal avenues. In connection with the arboretum, the university has also set aside several tracts on the Palo Alto estate for the preservation of native vegetation. These plant reserves embrace several hundred acres, and contain a variety of plant formations, such as streambank, redwood cañon, oak, madroña forest, serpentine outcrops, and chaparral. In a preliminary survey of the reserves sixty-four species of native lignescent plants were catalogued.

On Tuesday forenoon, August 1, Professor John W. Harshberger and a class of students from the Biological Laboratory of the Brooklyn Institute, at Cold Spring Harbor, L. I., visited the Garden. On the afternoon of the same day Mr. Nixon and a class in botany from the Columbia University also visited the Garden.

By the time this issue of the RECORD reaches its readers the second bunch of bananas to be grown in the economic house of the Garden will be nearly ready for harvesting.

On nomination of the sectional committee, Dr. Gager has been elected vice-president and chairman of Section G (Botany) of the American Association for the Advancement of Science for the coming New York meeting, in place of Prof. T. J. Burrill, deceased.

On Saturday morning, August 12, Dr. Jean Broadhurst and a class of about fifty students in the summer session at Teachers' College, Columbia University, visited the Garden, primarily to inspect our children's gardens and work of elementary instruction. At the end of their itinerary the ladies were presented by the children with a nosegay and the men with a single flower, picked from the children's gardens.

Bulletin 34, Agricultural Educational Series, of the Department of Land Records and Agriculture, United Provinces of Agra and Oudh, India, is entitled "A brochure on school gardens," by H. J. Davies, F.R.H.S., superintendent, Government Horticultural Gardens, Lucknow. The bulletin contains detailed directions for laying out and caring for children's gardens, and six pages of tabular matter, giving "instructions for sowing flower seed in the hills and plains of the United Provinces." In the RECORD for January, 1913, attention was called to the extensive development of children's gardens in Ceylon.

The grading for the extension of the brook on the south addition, the digging of the brook, and sewer and water connections on this area were completed during the summer. The west half is now in lawn (September 30), but the east side of the brook will have to be delayed until spring, when the soil improvement scheme will be completed on that side. Early in the spring of 1917 it is planned to move the systematic collections so as to

occupy this and adjoining areas. The brook continues the present stream for over 600 feet, with three falls and rapids, and ends in the new terminal pool, which is larger than any other on the line of the brook.

Installation of the Fern Garden.—In the *American Fern Journal* for July–September, 1916 (Vol. 6, No. 3), there is a list of fifty-two hardy ferns now growing in our fern garden. This garden has been made the depository for the American Fern Society, but only so much of it has been made as will hold the present collections; with the cooperation of the Society, it is expected that the collection will steadily increase. Dr. R. C. Benedict, resident investigator at the Garden, and one of the editors of the *American Fern Journal,* has planned the details of this garden, which is being started on the knoll at the north end of the local flora valley.

Resignation of the Librarian.—On August 4, Dr. Laura E. Watson Benedict, librarian of the Garden since January 1, 1915, tendered her resignation, to take effect on August 31. Dr. Benedict's large experience in library administration (*Cf.* BROOKLYN BOTANIC RECORD 4: 28–29. A 1915) enabled her to render services of great value in the organization of our library almost *de novo,* and it is sincerely regretted that the consideration of her own best interests made her feel that her resignation was imperative at this time.

Appointment of Miss Simpson.—On September 18, Miss Ray Simpson entered upon her duties as librarian of the Garden, in place of Dr. L. E. W. Benedict, resigned. Miss Simpson's professional record is as follows:

1908–09 Student N. Y. Public Library Training class.
1909–14 Harlem Library Branch N. Y. P. L.
1914–15 Student in N. Y. Public Library School.
1915–16 Senior Assistant in Aguilar Branch, N. Y. P. L., during which time a "Library Survey of the Aguilar Branch District" was made, as a basis for a thesis for the second year work at the Library School, as well as a map which indicated the various social, religious and philanthropic, and political tendencies in the district.

Field Trips for Nature Study with Plants.—During the past season Mr. Stoll, of the Garden staff, conducted field trips for nature study, with special reference to Boy Scouts' requirements, as follows: February 12, Rosedale, L. I. (woods); May 30, Van Cortlandt Park, N. Y. C. (open country); June 10, trip for scoutmasters to the camp of Ernest Thompson-Seton, Greenwich, Conn. (trees); July 4, Prospect Park and the Botanic Garden (trees and shrubs); July 7–9, Tuxedo, N. Y. (trees and shrubs). From July 18 to 21, Mr. Stoll visited a chain of four camps of boy scouts at South Kent and Twin Lakes, Conn., and Ancram and Woodland, N. Y., giving instruction and conducting field trips. During the season about 450 individuals have availed themselves of the opportunities offered under Mr. Stoll, with a total attendance of 1150.

Cooperation of the Garden in Teachers' Institute Work.—The Garden cooperated materially in the recent two weeks' session of the Teachers' Institute conducted by the New York City Board of Education, prior to the opening of the schools to pupils. Seventy teachers, consisting of one delegate each from the schools in the two districts presided over by Miss Grace Strachan, came to the Garden for two-hour conferences and instruction by Miss Shaw during every afternoon for the two weeks. These delegates were designated as "school garden delegates," and they were chosen from those teachers who were specially interested in school gardens and nature study.

The Brooklyn Training School for Teachers sent their practice teachers to visit the Garden, and to learn more of our work in cooperation with schools. Also the regular teachers of the Training School, with Professor Holtz as guide, spent a morning at the Garden, learning in particular of our work for children in gardening and nature study. The kindergarten teachers of the free kindergartens of Brooklyn came to look over the nature study work with children at the Garden. Finally, four of the high schools of Brooklyn sent parties of teachers from their biology departments to visit the Garden, and to learn of our plans for cooperation with the high schools of the vicinity.

Arrangements have just been completed in New York whereby the resources of The Engineering Foundation, under the auspices of the four principal national engineering societies, are placed at the disposal of the National Research Council, which was appointed by the National Academy of Science at the request of President Wilson. The object of the council is to coordinate the scientific research work of the country in order to secure efficiency in the solution of the problems of war and peace. The council was without funds until The Engneering Foundation, established to further scientific and engineering research, offered to place its resources at the council's disposal, including the services of its secretary, Dr. Cary T. Hutchinson, to act as secretary of the council. The offer was accepted and plans for immediate activities have been placed in the hands of an executive committee.

Fundamentals of Botany, a text-book for university and college use, by Dr. C. Stuart Gager, was issued in September by P. Blakiston's Son & Co. The book comprises 640 pages, with 435 illustrations.

The large plan of the systematic collection of the Garden, prepared by Mr. Caparn and Mr. Taylor, was loaned to the Missouri Botanical Garden for an exhibition of Landscape Architecture during October.

Dr. George W. Reed, who spent three months at the Garden during the past summer as resident investigator, has returned to his duties as professor of botany in the University of Missouri. Dr. Reed's problem is a survey of the diseases of the trees and shrubs in Prospect Park and the Garden.

On nomination of the sectional committee, Dr. Gager has been elected vice-president and chairman of Section G (Botany), of the American Association for the Advancement of Science, for the coming New York meeting, in place of *Prof. T. J. Burrill,* deceased.

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